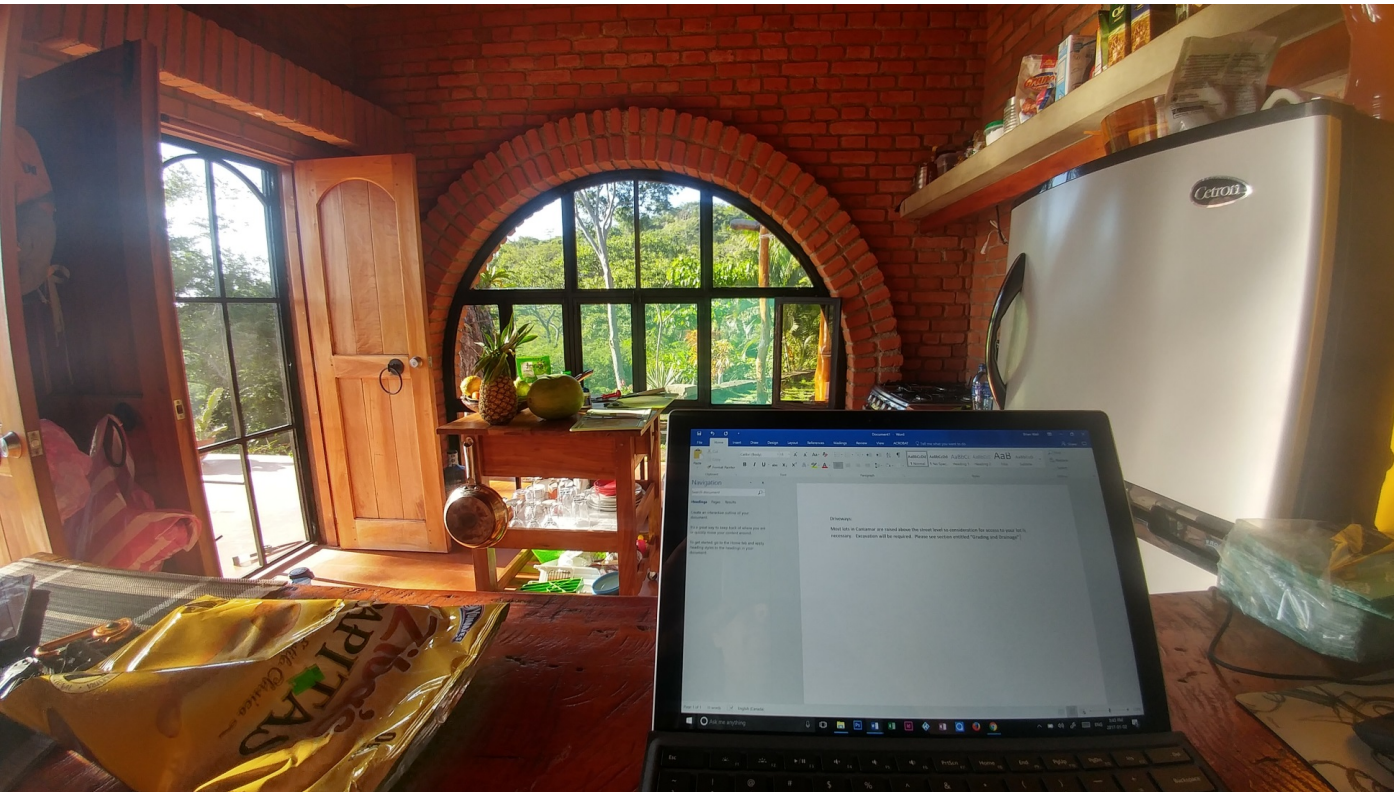




# Ecological Development in a Developing Country

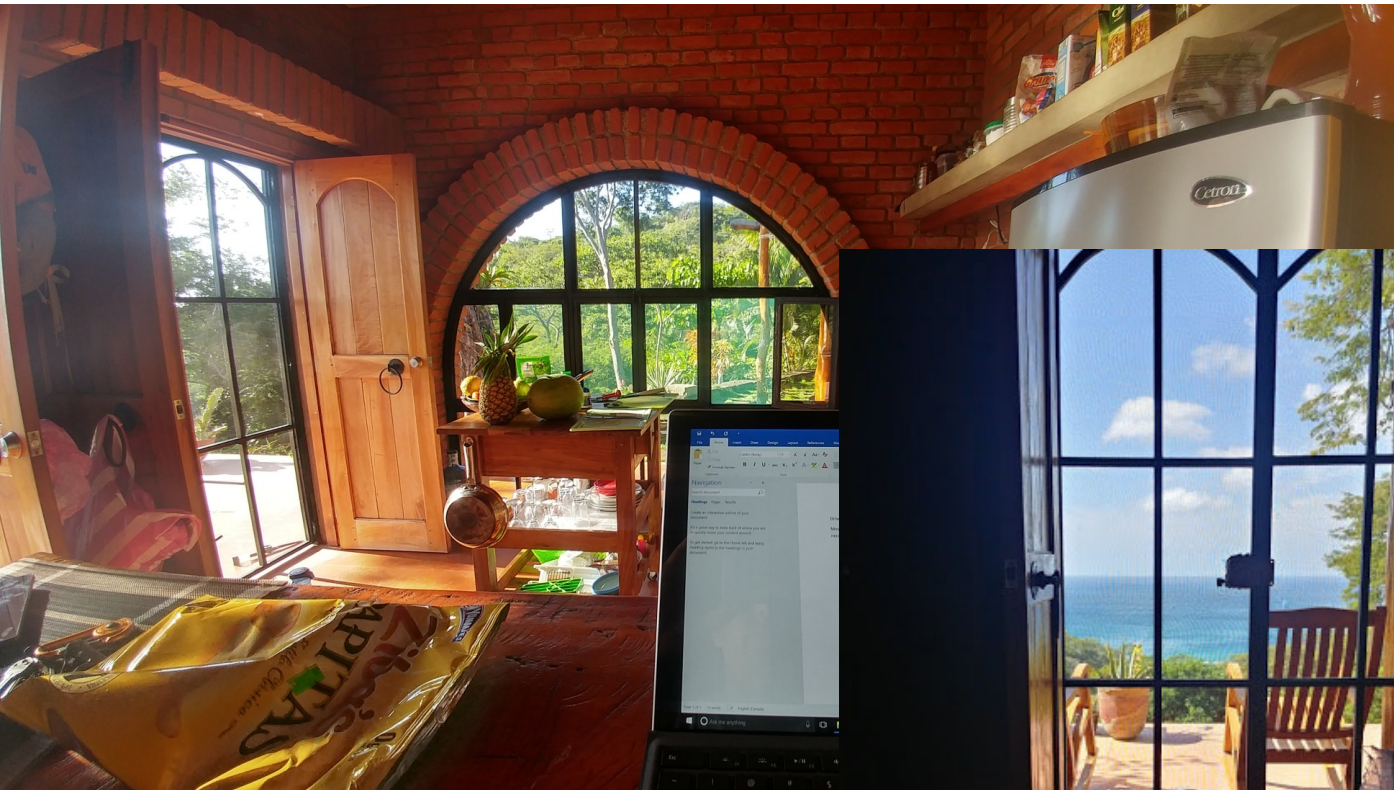




Inspiration

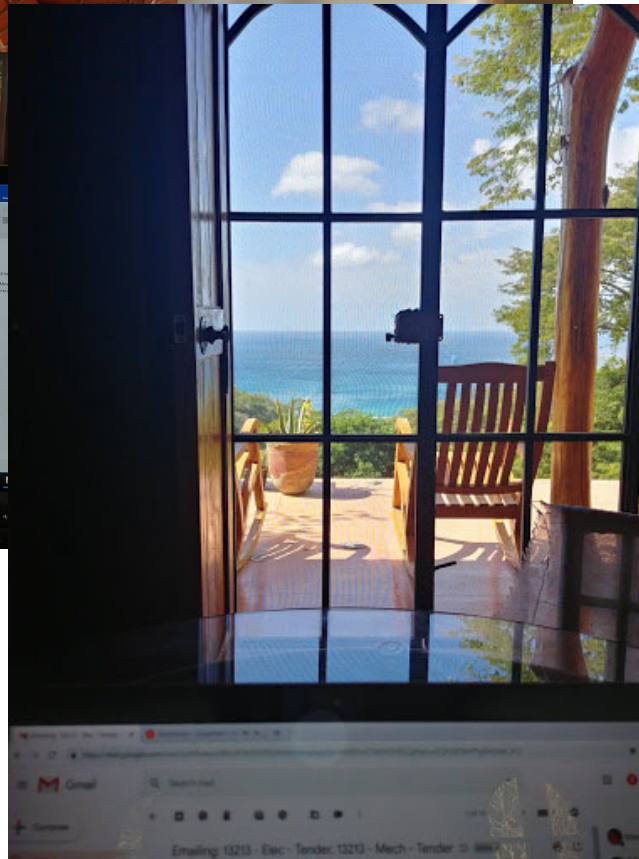
Ecological Development in a Developing Country



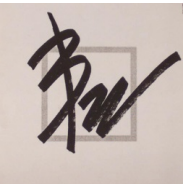


Inspiration

2015



Ecological Development in a Developing Country





# Research



Cantamar de Yankee is a development in South West Nicaragua comprising two hundred residential lots.

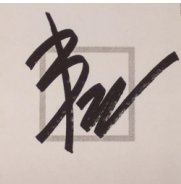
Lot owners are beginning to develop their lots and need guidance to ensure their buildings and sites are developed ecologically and responsibly.

Nicaragua is a developing nation, considered the second poorest in the world, where ecologically responsible building practices and materials are not readily available or commonly known.

This document is the result of an exploration of the history, climate, economy and potential of sustainable building practices of Nicaragua. The goal was to demonstrate how design guidance might assist Cantamar de Yankee in promoting growth that is environmentally responsible, culturally sensitive and in keeping with the mandates of a respective Lot Owners Association (LOA).

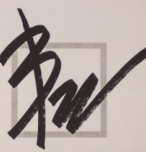
The result was the formation of a data set that can serve as a guide to designers, builders and lot owners desiring to build in a responsible manner in this developing country.

Thesis Statement



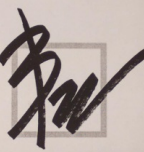


# Ecological Development in a Developing Country





## 1.0 Design Philosophy





## 1.0 Design Philosophy

## 2.0 Site & Landscape Guidelines

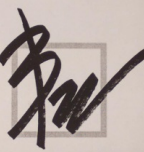




1.0 Design Philosophy

2.0 Site & Landscape Guidelines

3.0 Architectural Guidelines



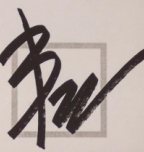


1.0 Design Philosophy

2.0 Site & Landscape Guidelines

3.0 Architectural Guidelines

4.0 Energy Considerations





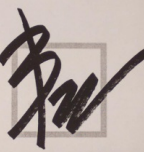
1.0 Design Philosophy

2.0 Site & Landscape Guidelines

3.0 Architectural Guidelines

4.0 Energy Considerations

5.0 Design Review





1.0 Design Philosophy

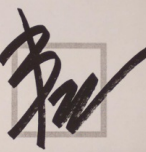
2.0 Site & Landscape Guidelines

3.0 Architectural Guidelines

4.0 Energy Considerations

5.0 Design Review

6.0 Miscellaneous





# Design Philosophy

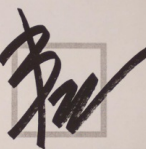
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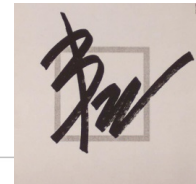
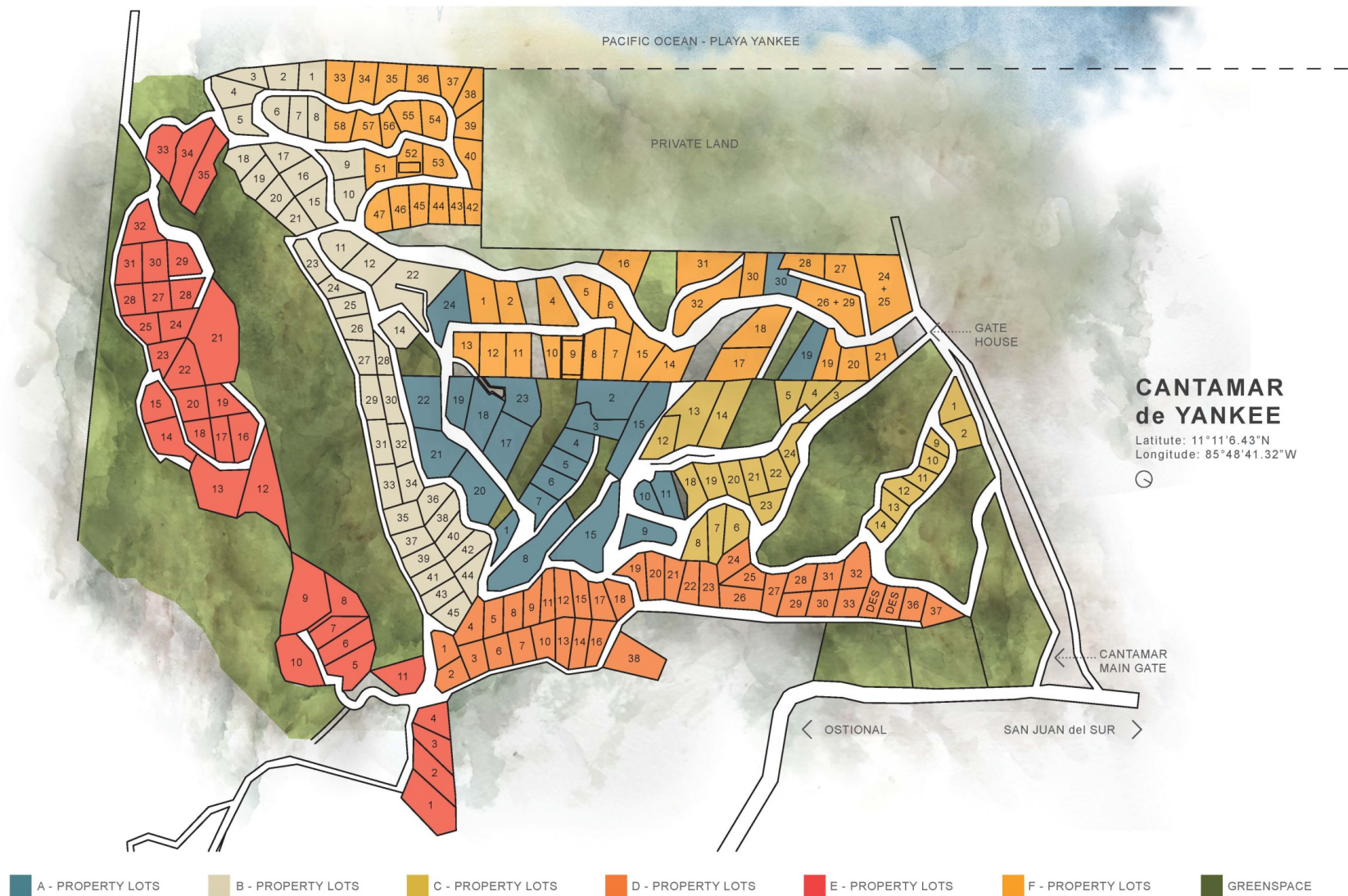
*[Signature]*

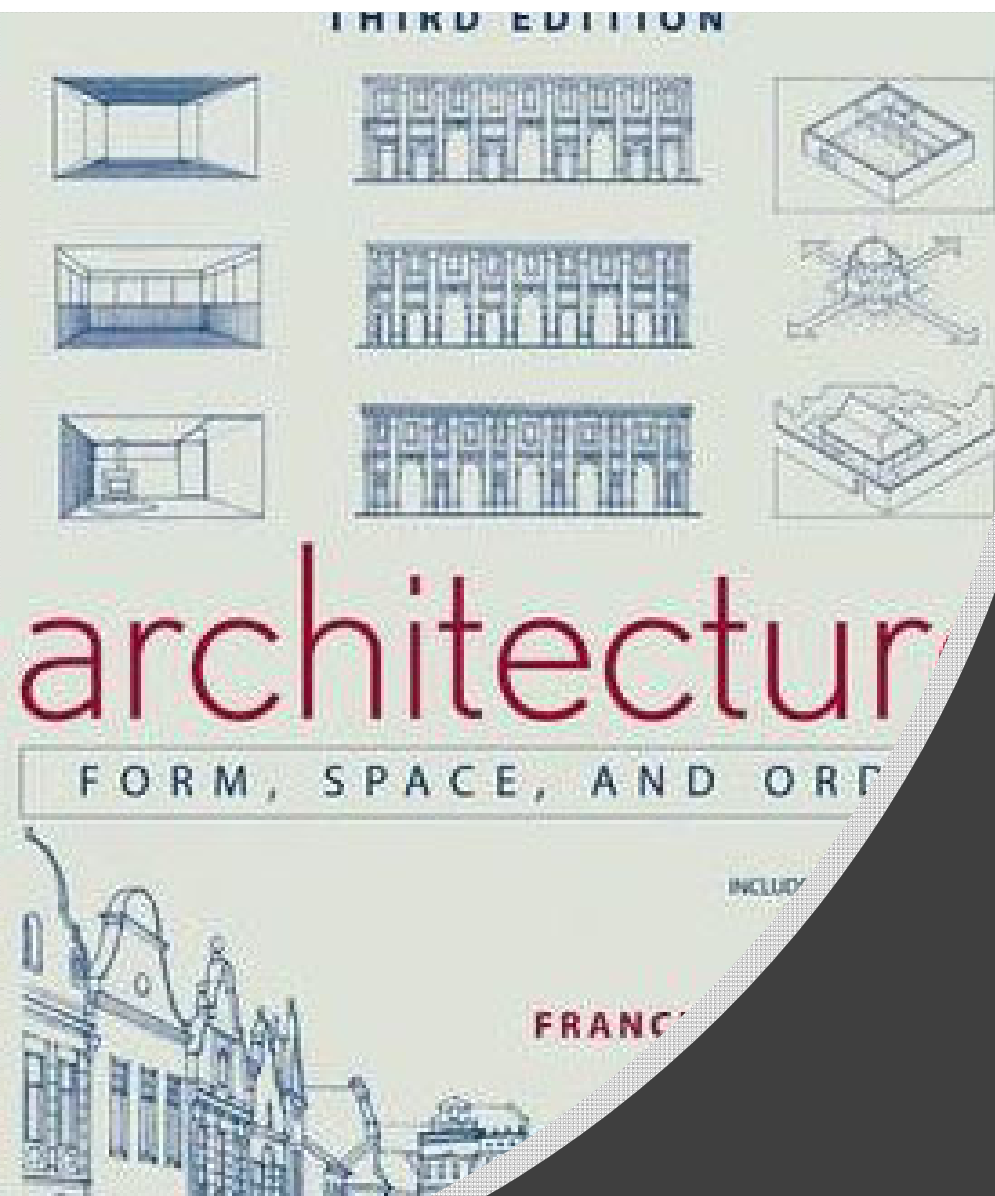


The sea, once it casts  
its spell, holds one in  
its net of wonder  
forever.

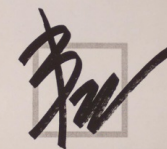
-Jacques Cousteau

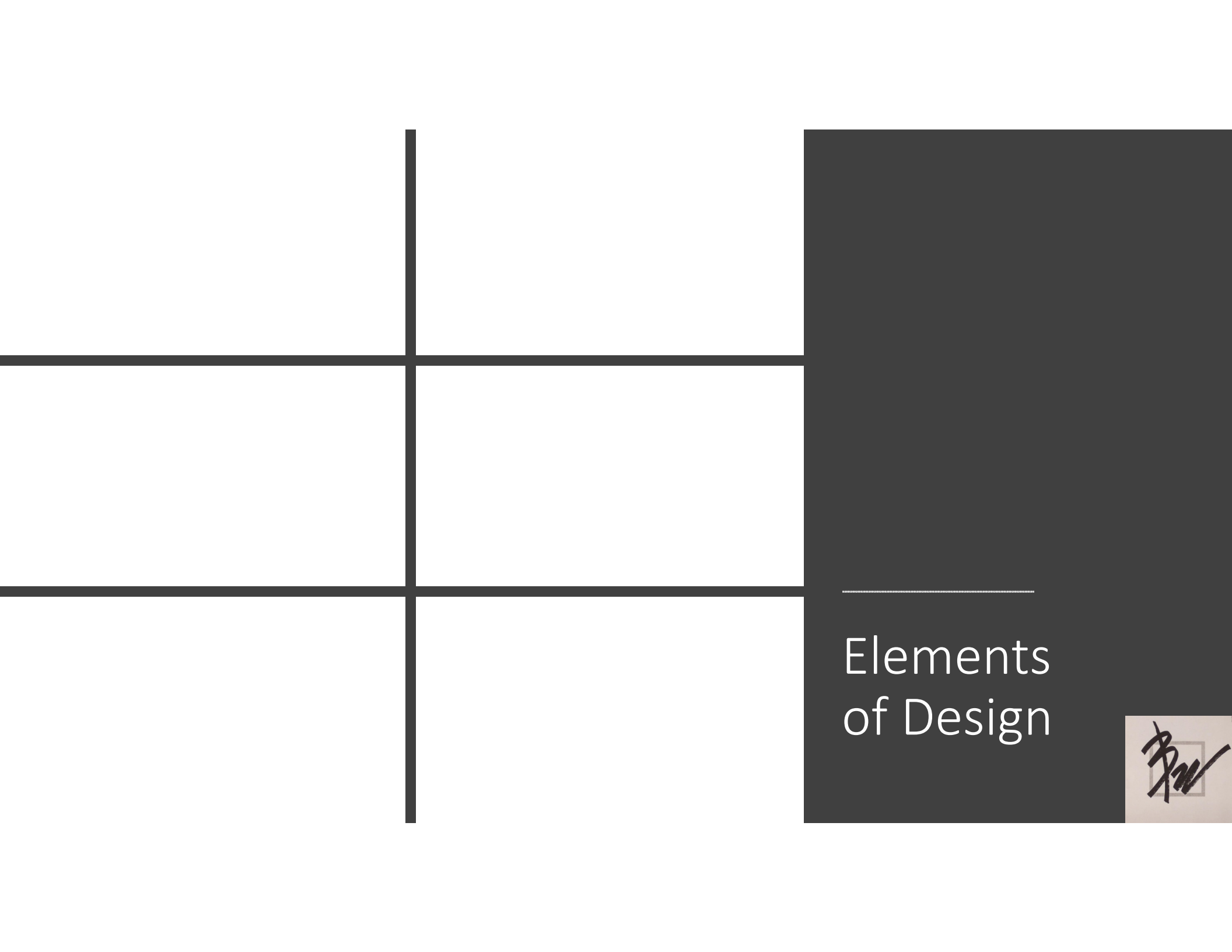




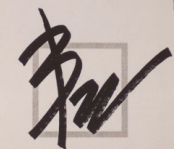


# Elements of Design





# Elements of Design

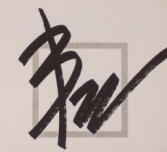


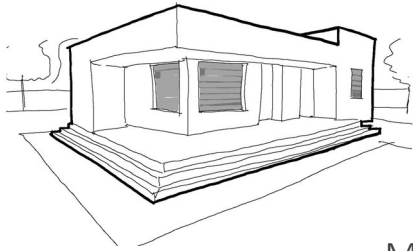


Spanish Colonial

---

# Elements of Design





Modern

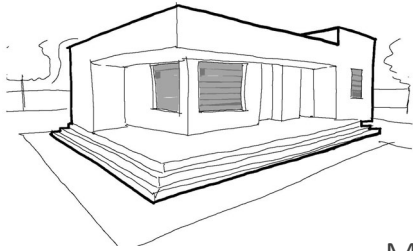


Spanish Colonial

---

Elements  
of Design

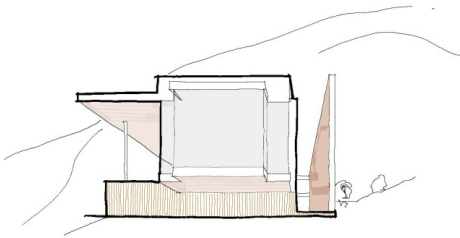




Modern



Spanish Colonial

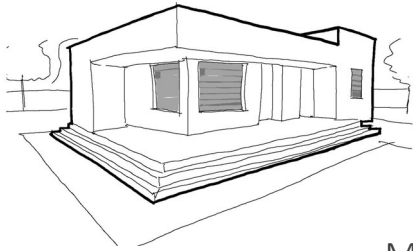


Modern (also)

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# Elements of Design

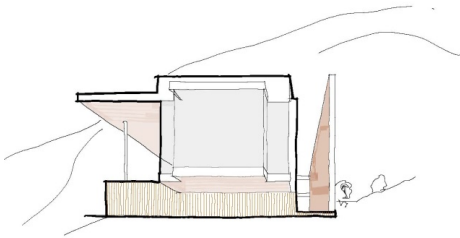




Modern



Spanish Colonial



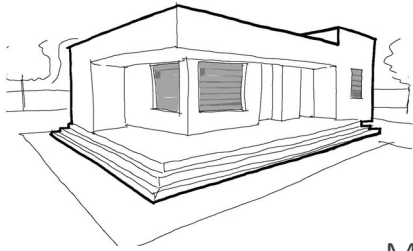
Modern (also)



Post Modern

# Elements of Design

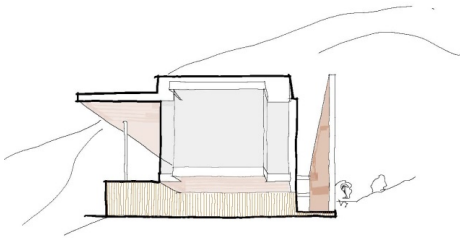




Modern



Spanish Colonial



Modern (also)



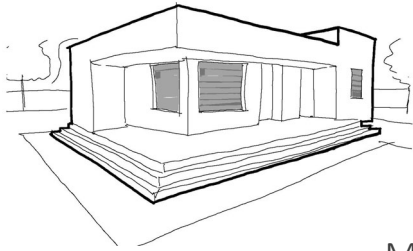
Post Modern



Baroque (elements)

# Elements of Design

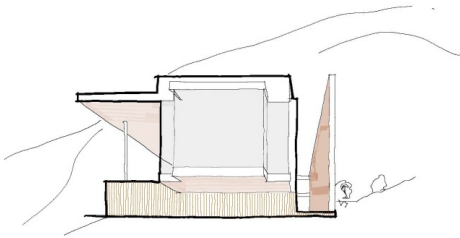




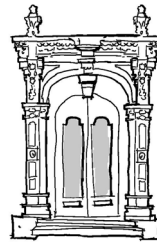
Modern



Spanish Colonial



Modern (also)



Baroque (elements)



Post Modern



Baroque (elements)

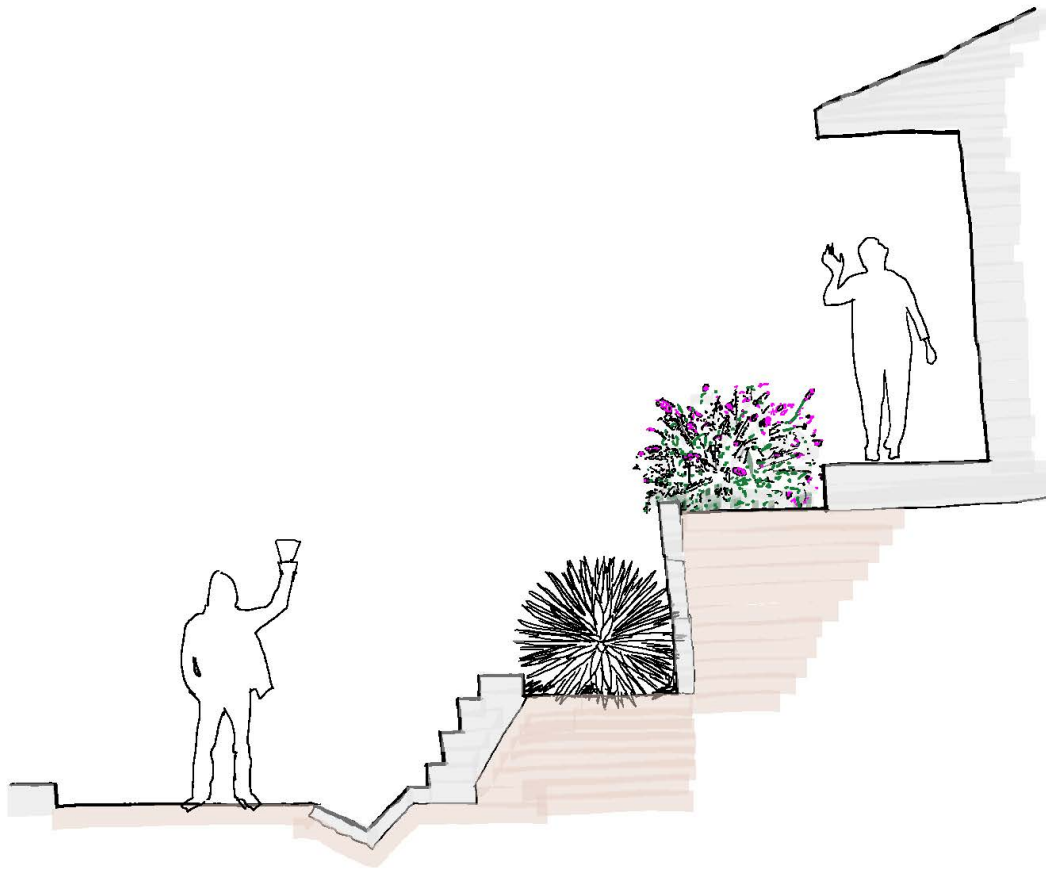
# Elements of Design



A photograph of a tropical landscape featuring a low stone wall, a Bird of Paradise plant, and a large circular graphic overlay. The text "Site and Landscape Guidelines" is centered within the circle.

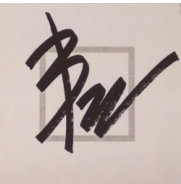
# Site and Landscape Guidelines

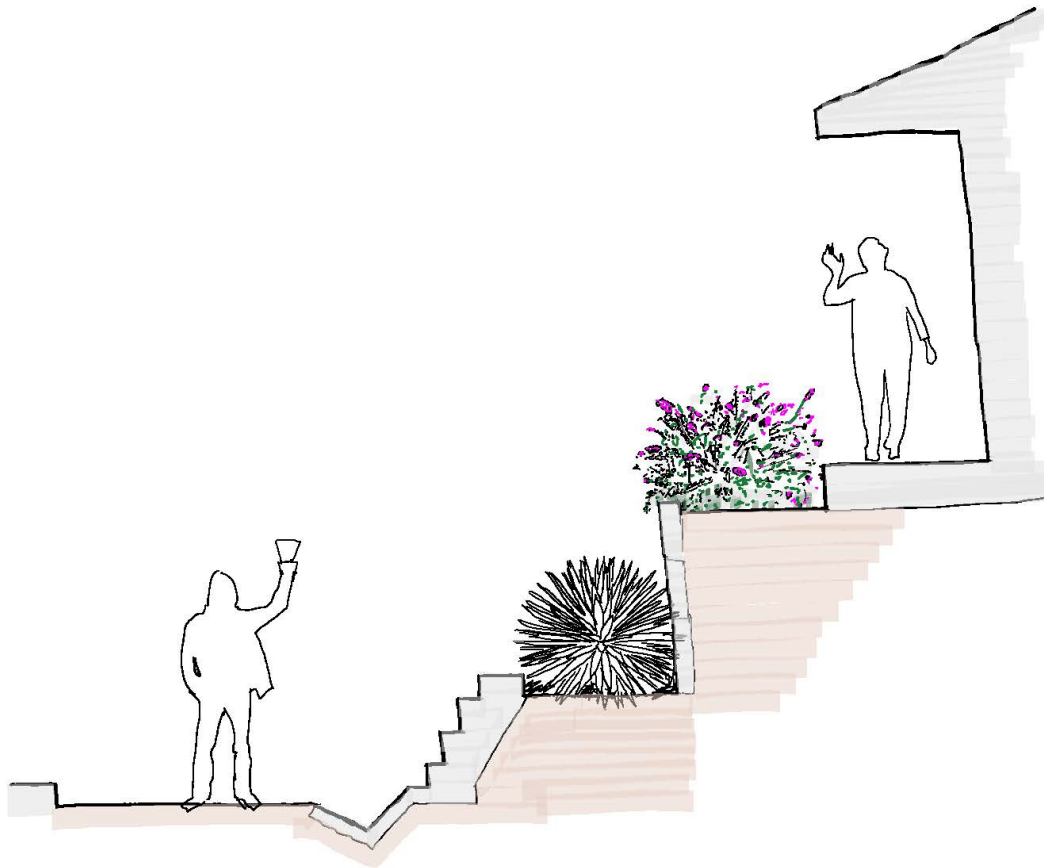




Elements of Zoning:

Ecological Development in a Developing Country

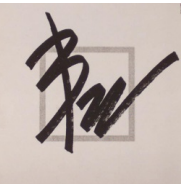


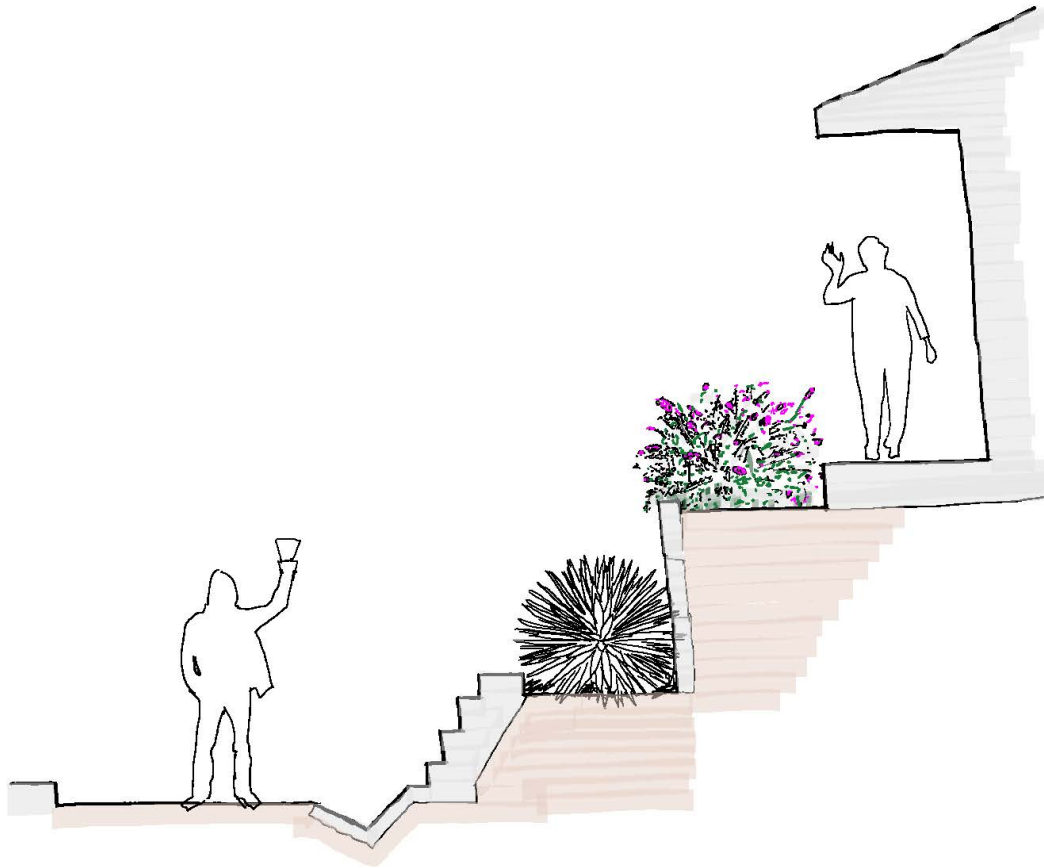


Elements of Zoning:

Setbacks

Ecological Development in a Developing Country



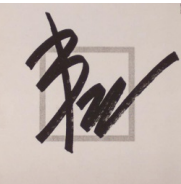


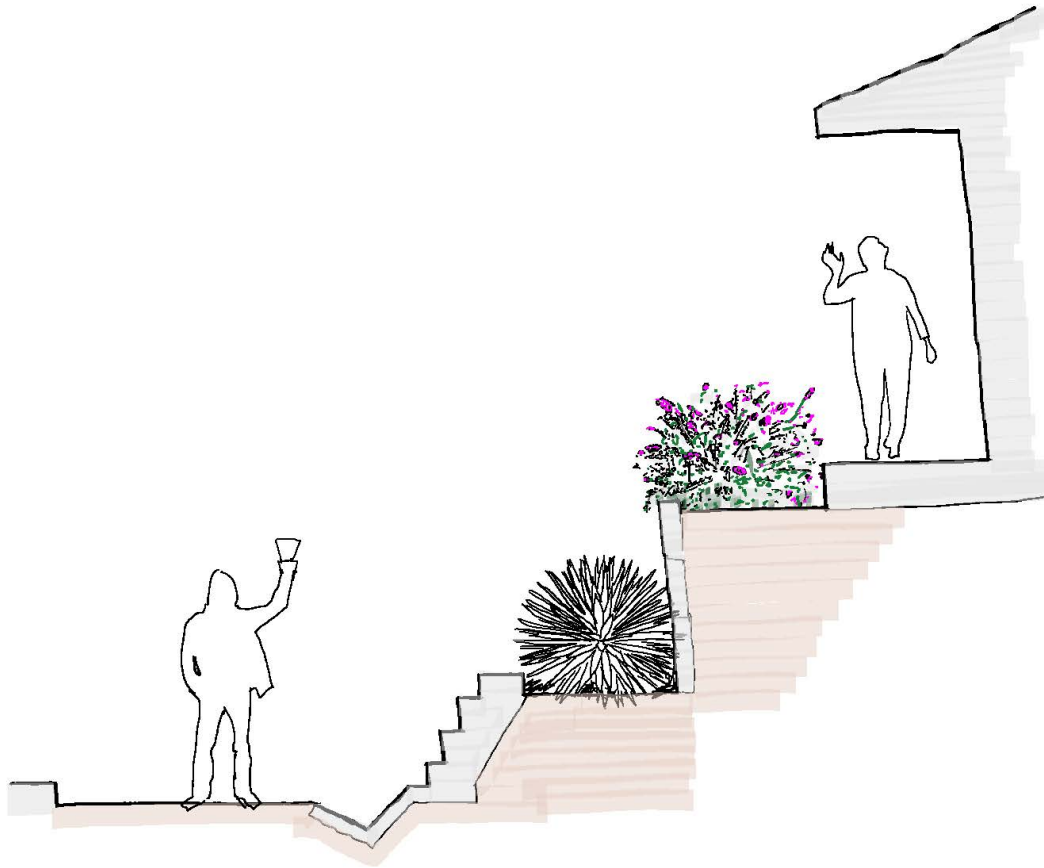
Elements of Zoning:

Setbacks

Building Placement

Ecological Development in a Developing Country





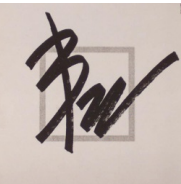
### Elements of Zoning:

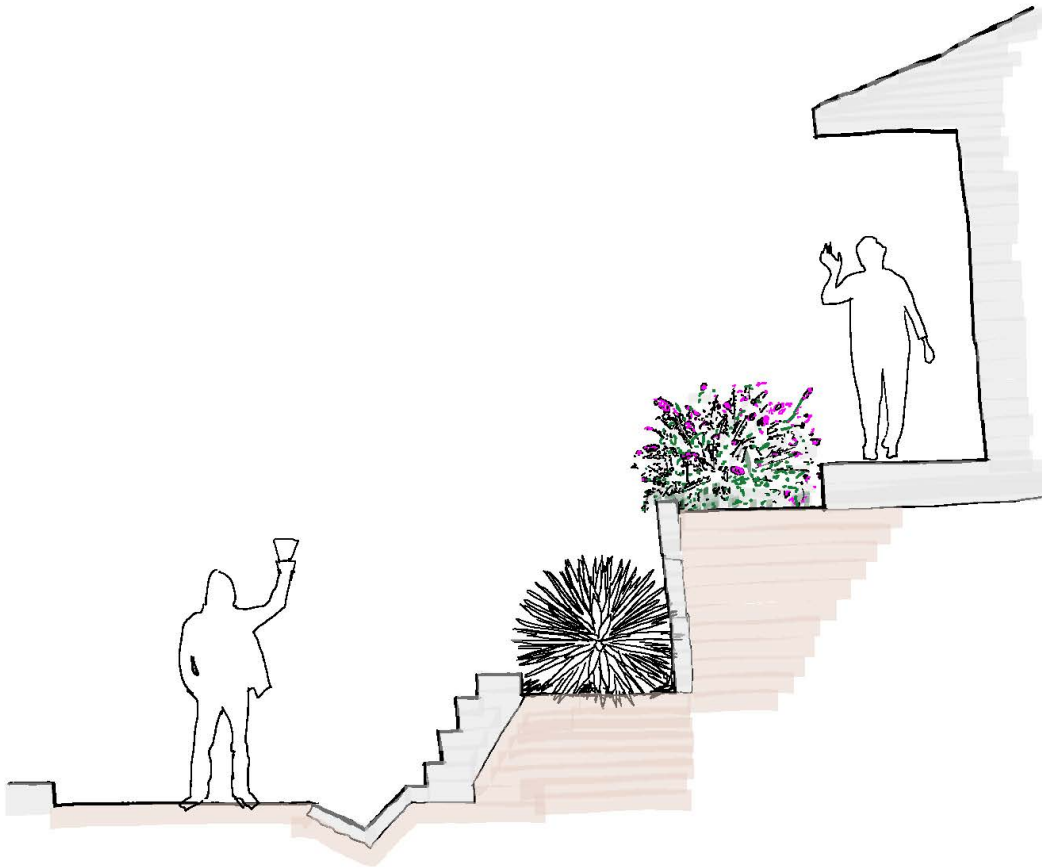
Setbacks

Building Placement

Vegetation

Ecological Development in a Developing Country





## Elements of Zoning:

Setbacks

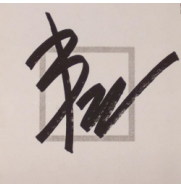
Building Placement

Vegetation

CPTED

(Crime Prevention Through Environmental Design)

Ecological Development in a Developing Country



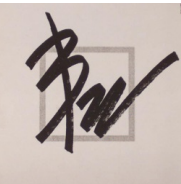
Transitions:



Transitions:



Transitions:



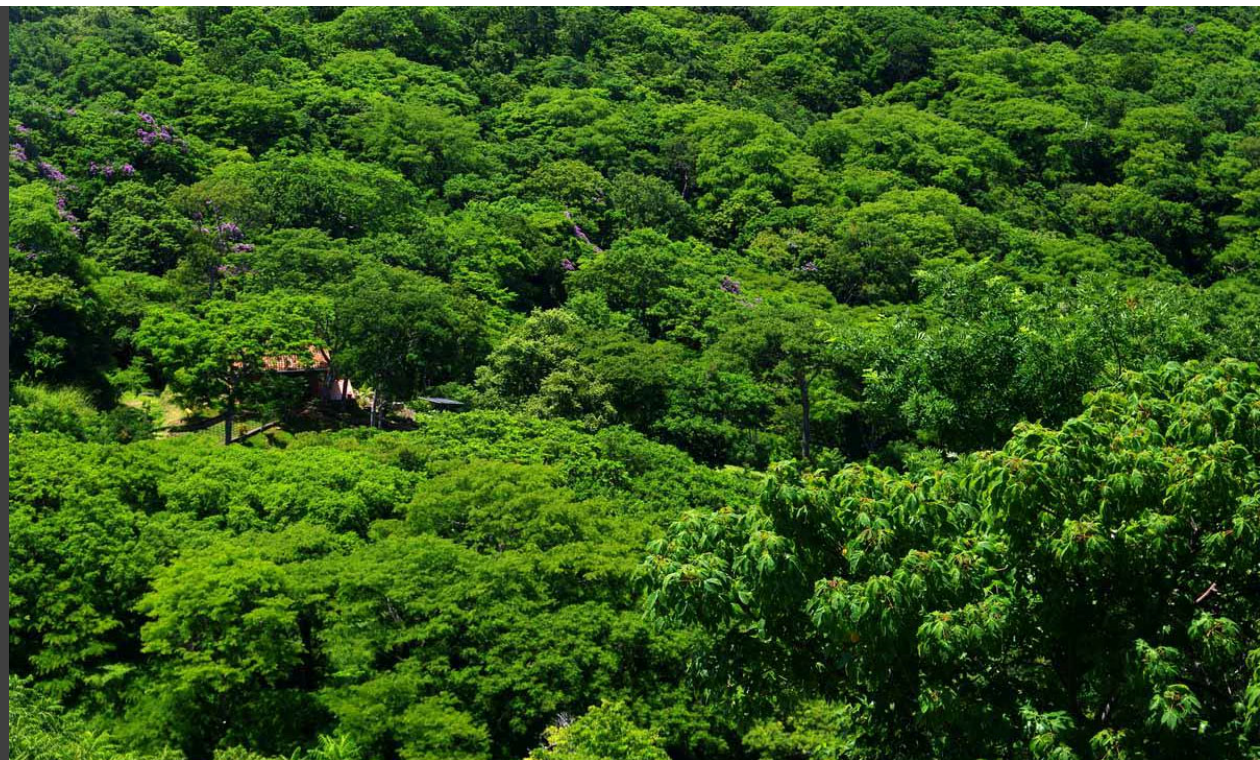
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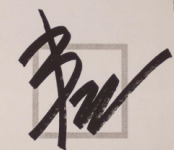
Transitions:



Handwritten signature or logo.

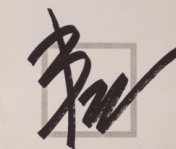


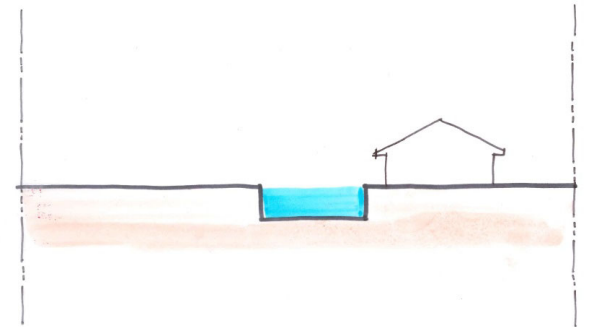
Lot Types:



# Lot Types

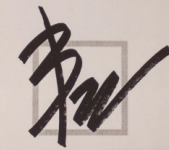
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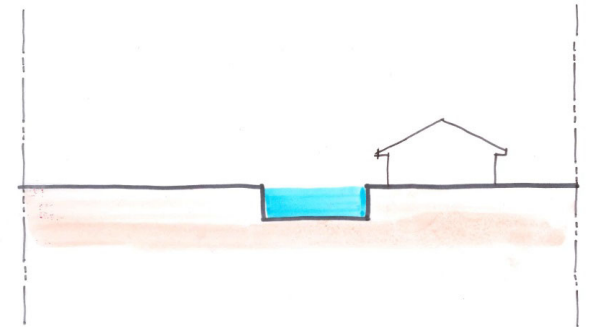




## Lot Types

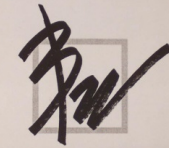
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## Lot Types

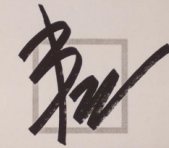
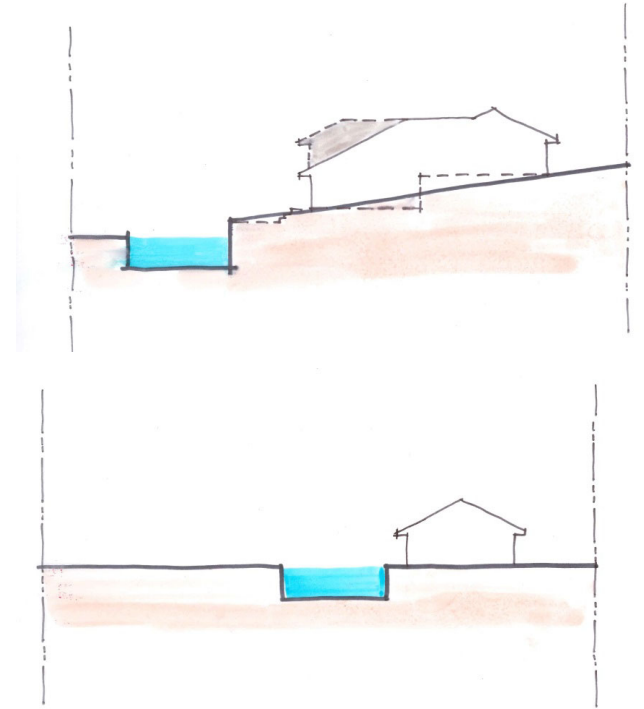
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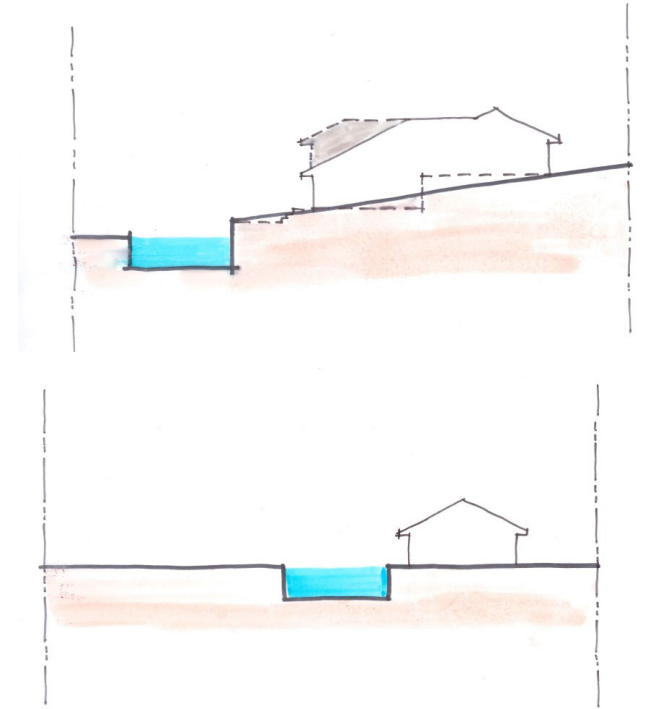




## Lot Types

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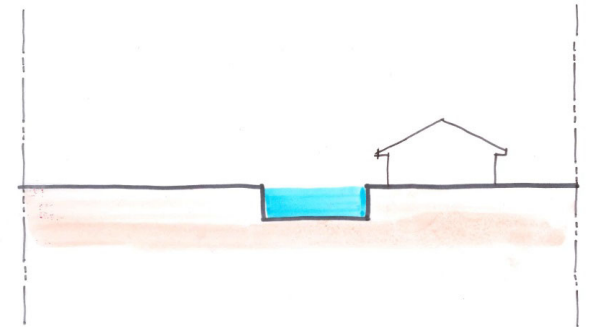
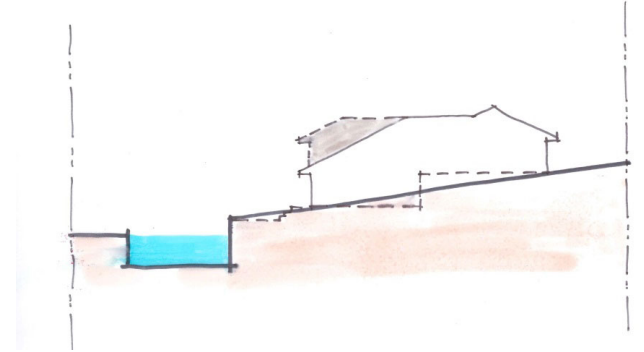
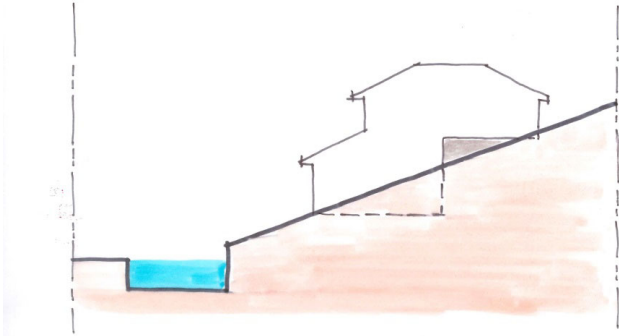




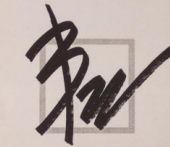
## Lot Types

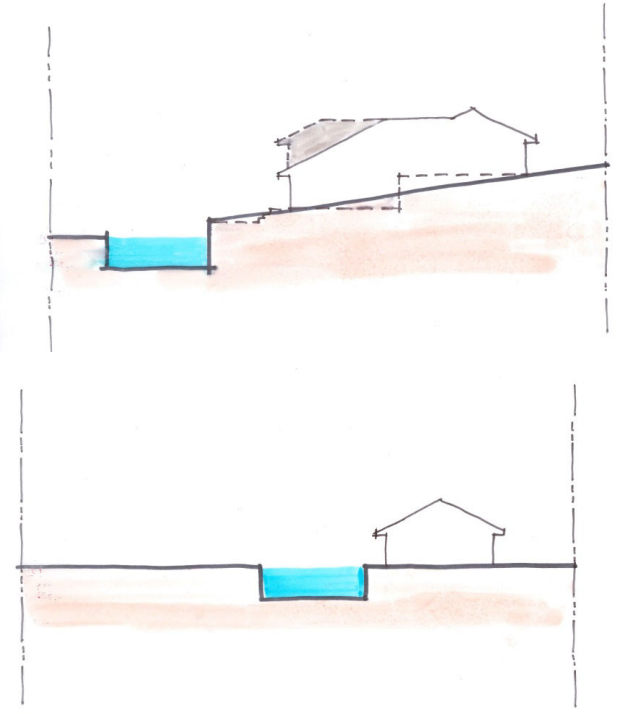
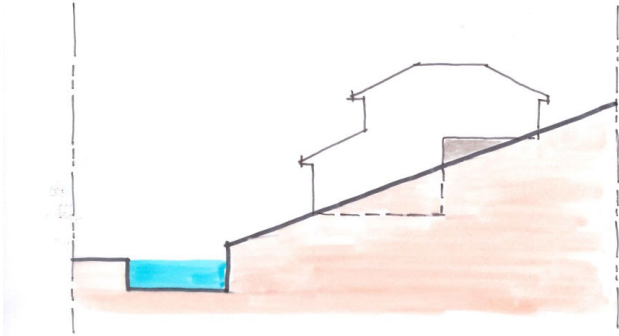
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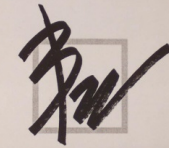


## Lot Types





## Lot Types





# Drainage



## Retaining Walls

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## Retaining Walls

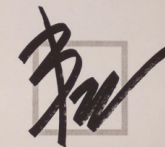
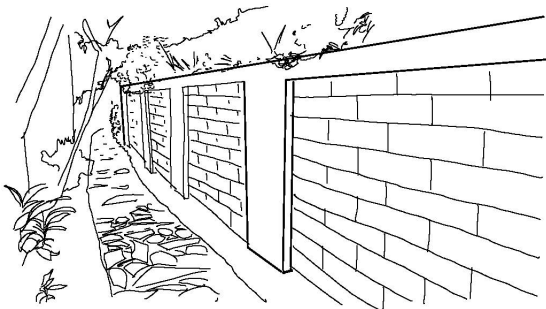
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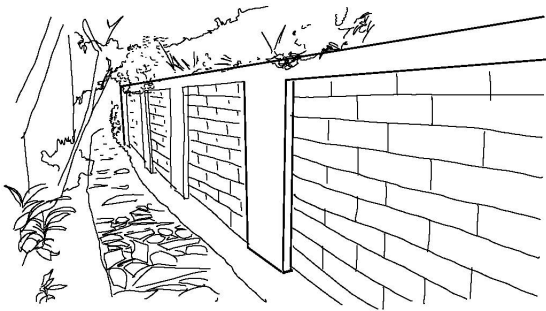
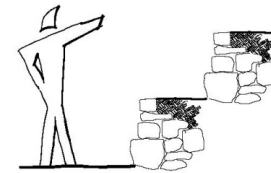
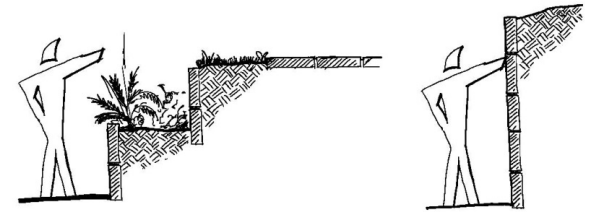




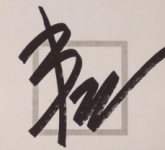
## Retaining Walls

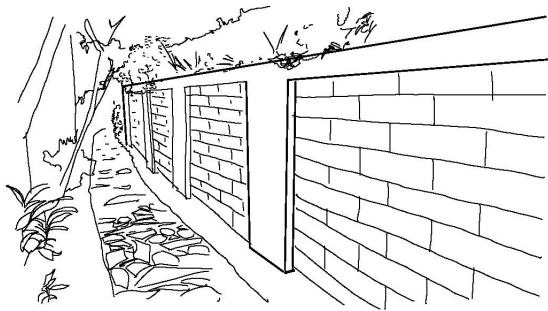
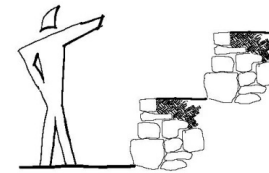
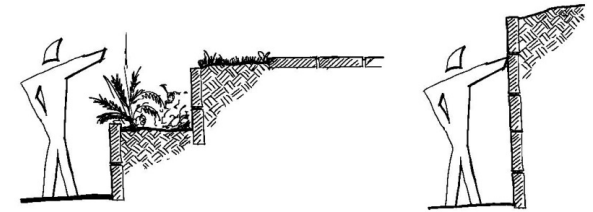
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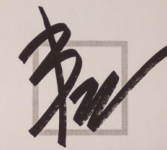


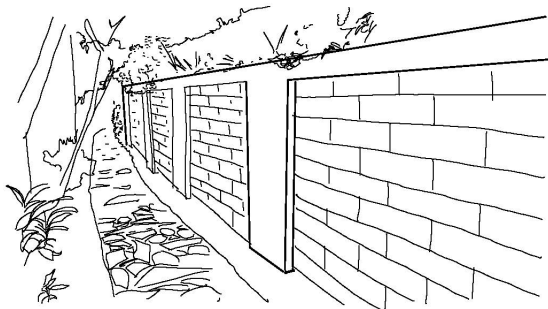
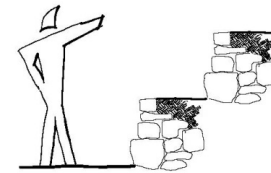
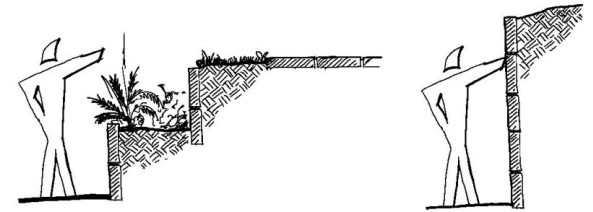
## Retaining Walls



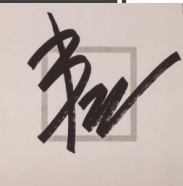


## Retaining Walls





## Retaining Walls





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Driveways





Grass

Driveways





Canteras  
Grass

Driveways





Gravel  
Canteras  
Grass

Driveways



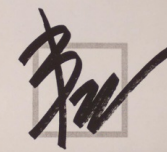


Concrete  
Gravel  
Canteras  
Grass

Driveways

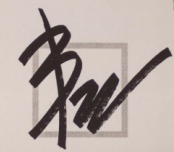


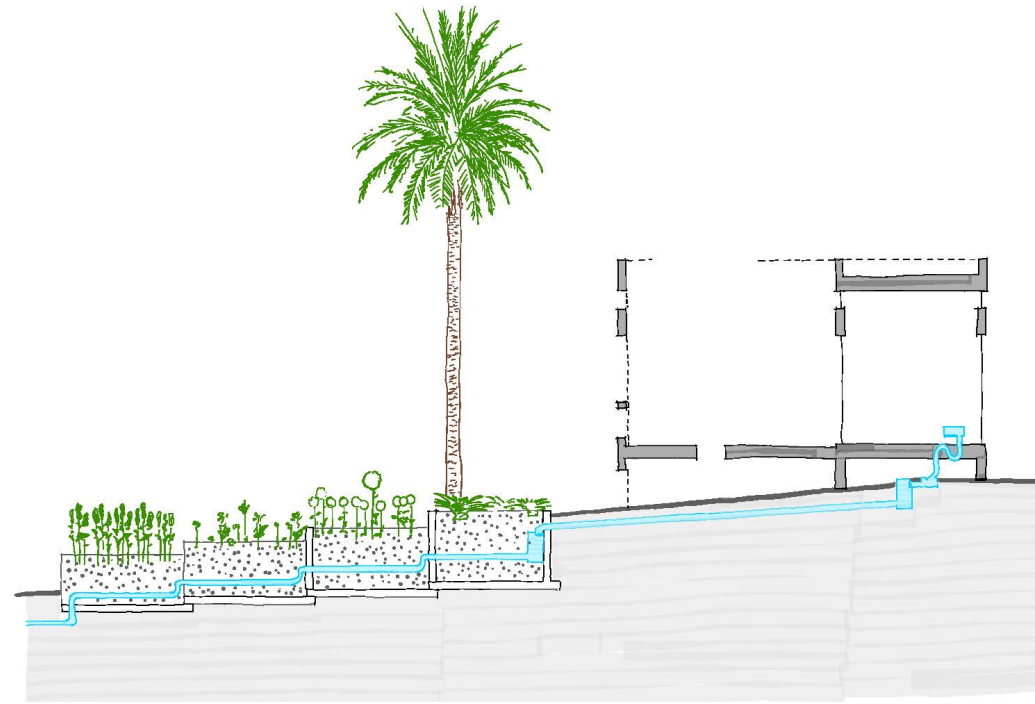
# Irrigation and Water Systems



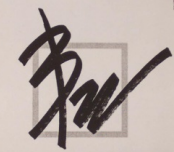


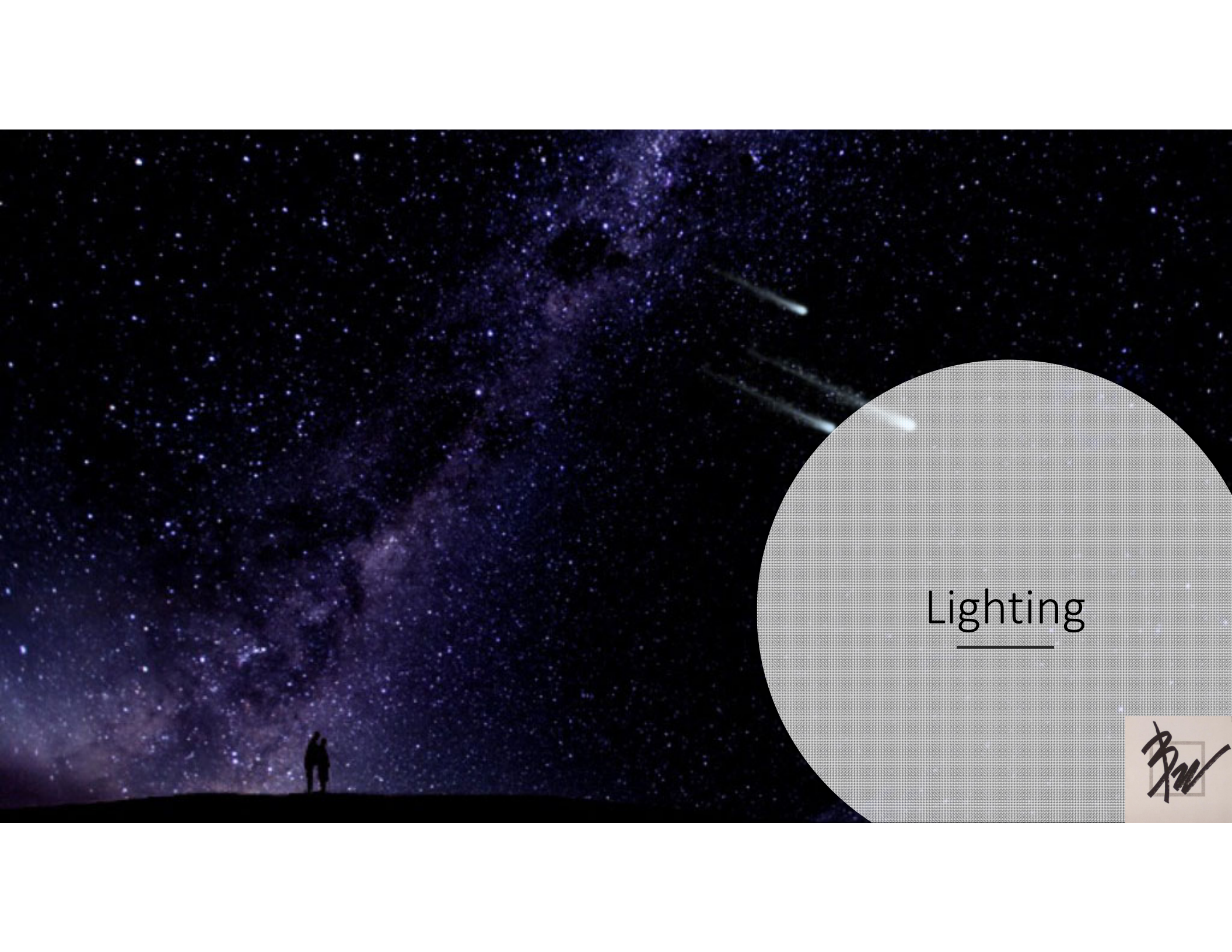
# Irrigation and Water Systems





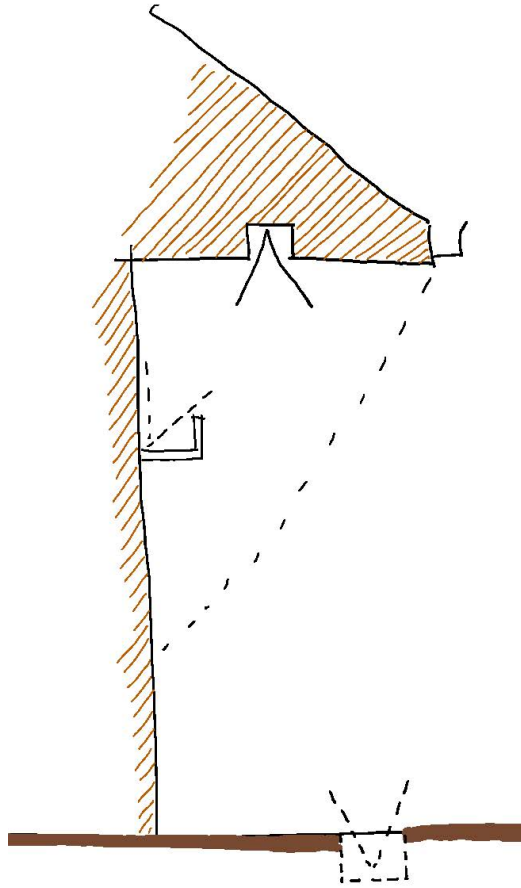
# Irrigation and Water Systems





# Lighting

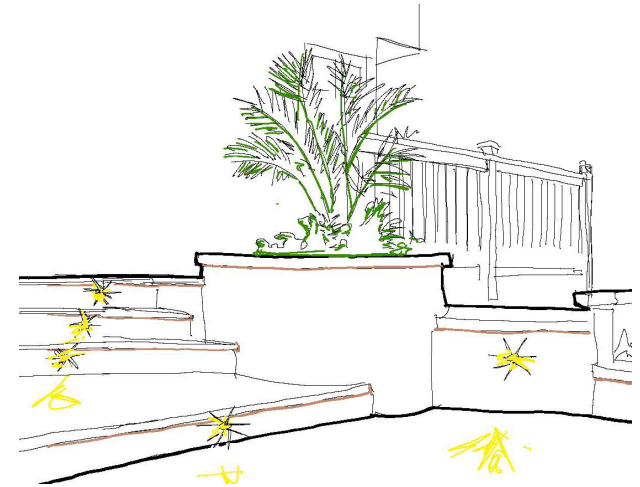
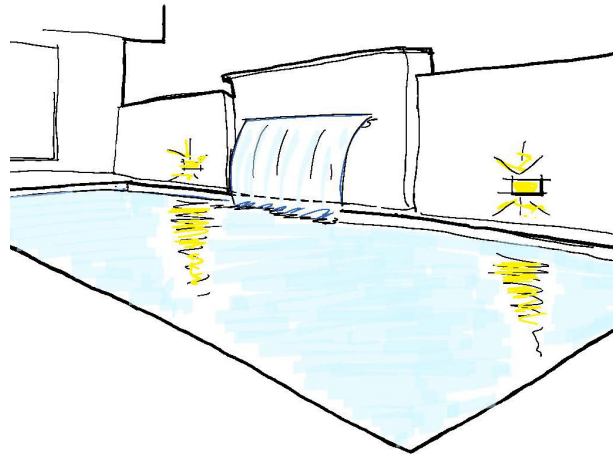
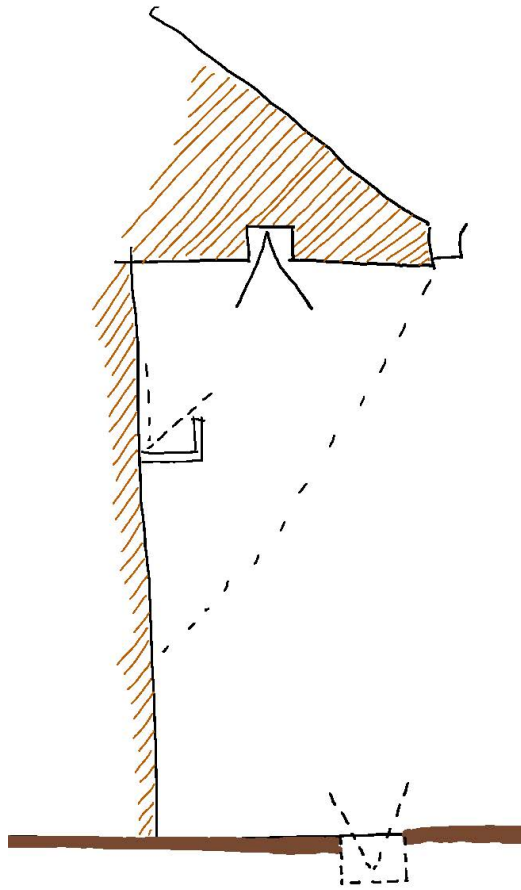




# Lighting

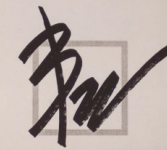
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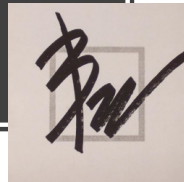
# Lighting

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No!!



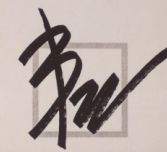
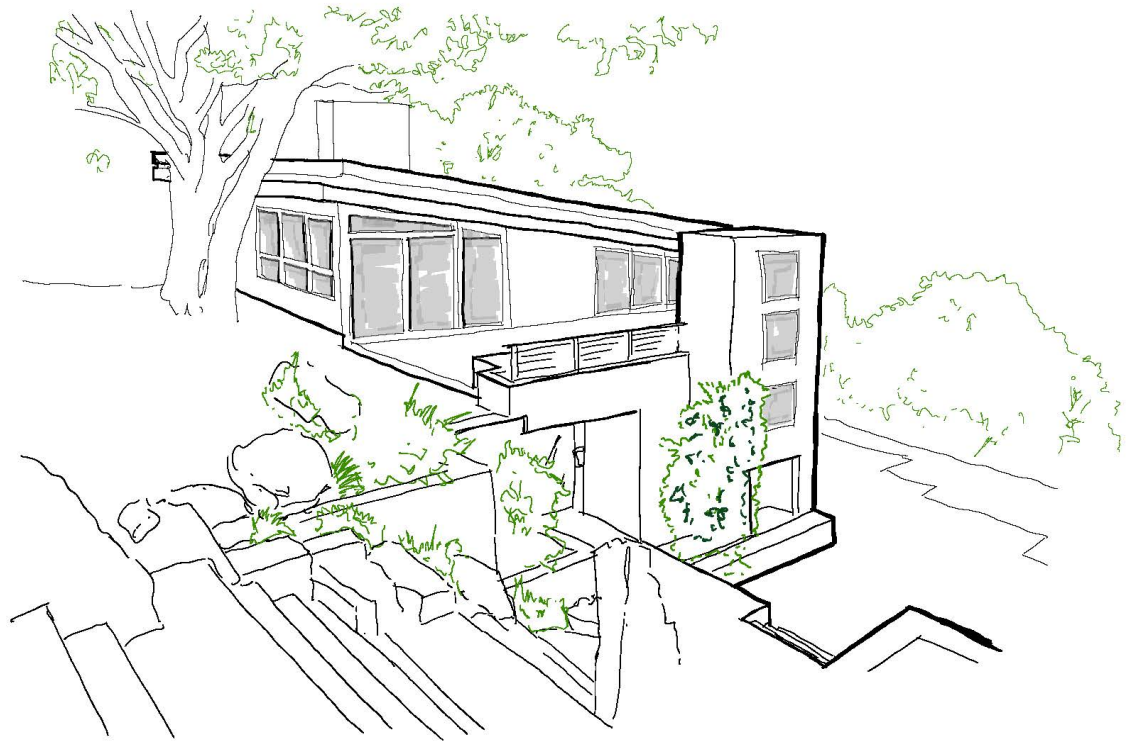


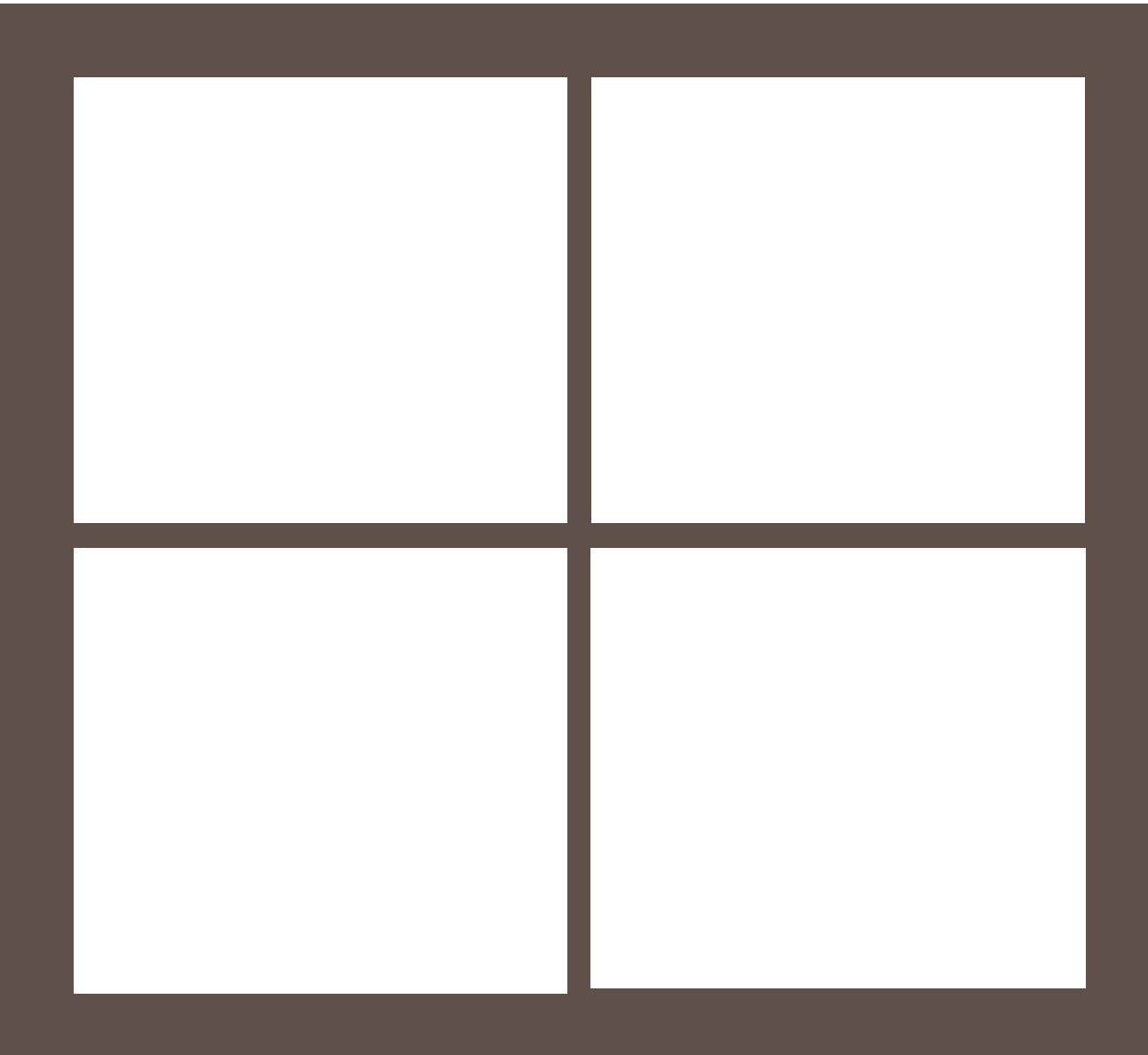
# Architectural Guidelines



# Building Height

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Mass:  
The Organization  
of Shapes

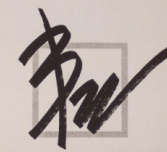
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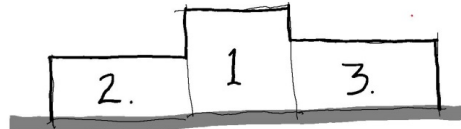




# Mass: The Organization of Shapes

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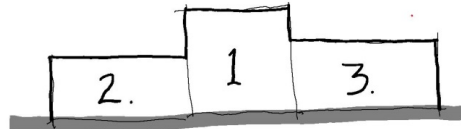




Mass:  
The Organization  
of Shapes

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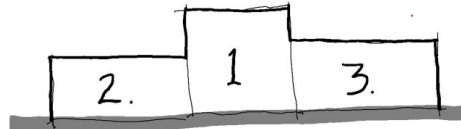
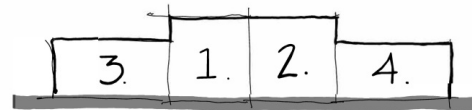




Mass:  
The Organization  
of Shapes

---





Mass:  
The Organization  
of Shapes

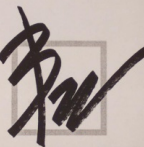
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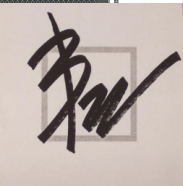
# Green Building

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# Green Building

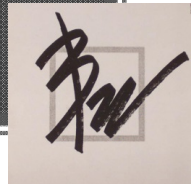
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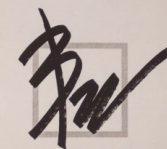
# Green Building

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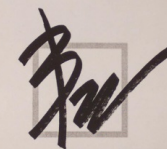
# Green Building



# Manufacturing

Green  
Building

---



Manufacturing

Footprint

Green  
Building

---



Manufacturing

Footprint

Sustainability

Green  
Building

---



Manufacturing

Footprint

Sustainability

Ability to re-use

Green  
Building

---



Manufacturing

Footprint

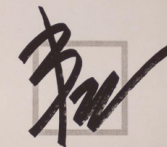
Sustainability

Ability to re-use

Locally sourced product

Green  
Building

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# Roof Materials

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# Roof Materials

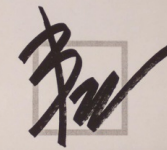
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# Roof Materials

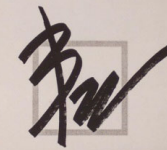
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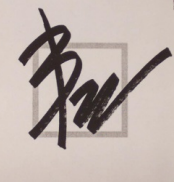
# Roof Materials

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# Exterior Walls

---





# Exterior Walls

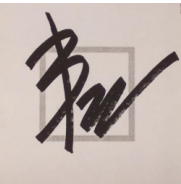
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# Exterior Walls

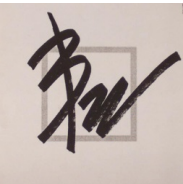
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# Exterior Walls

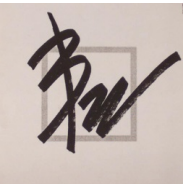
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# Exterior Walls

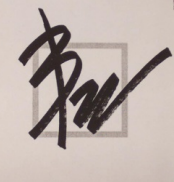
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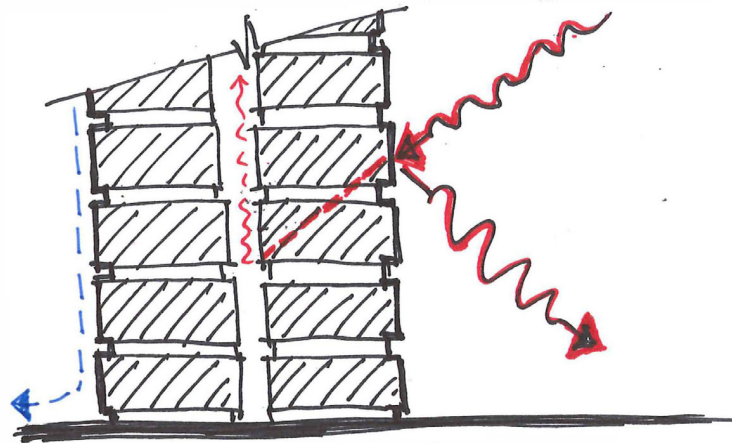




# Exterior Walls

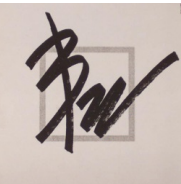
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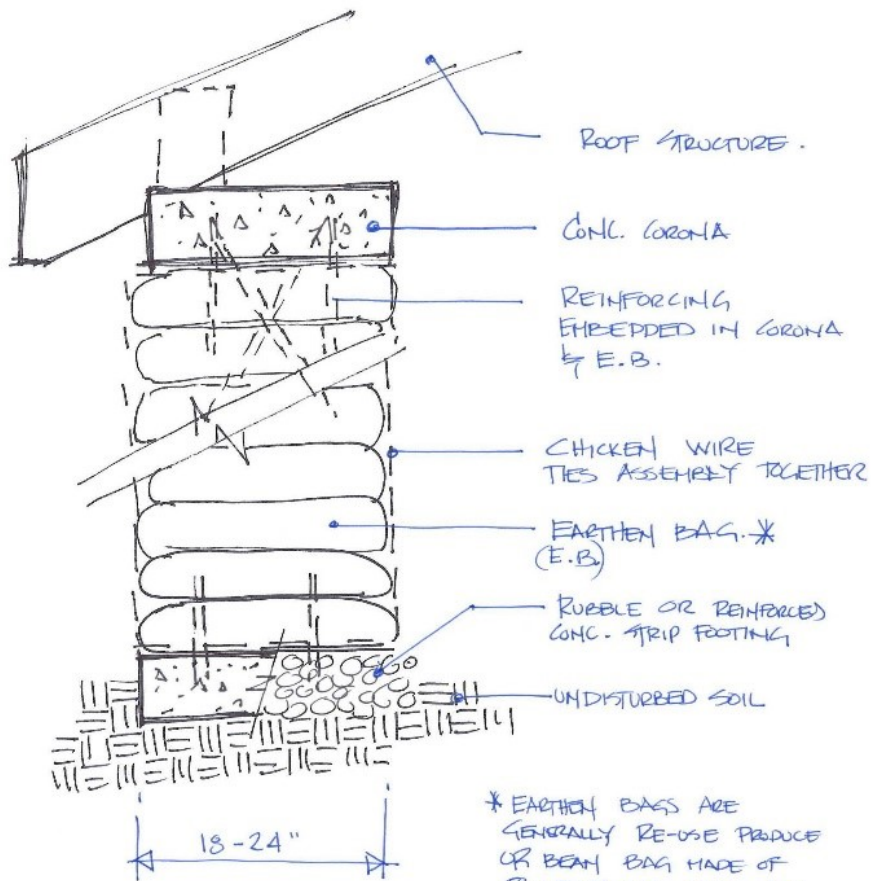




# Exterior Walls

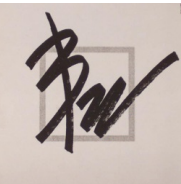
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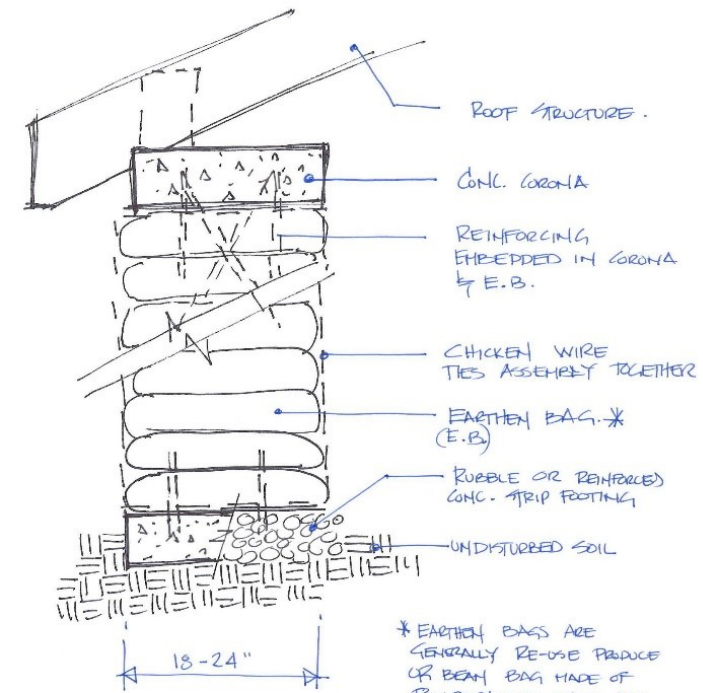




\* EARTHEN BAGS ARE  
GENERALLY RE-USE PAPER  
OR BROWN BAG MADE OF  
POLY PROPYLENE. THEY ARE  
FILLED WITH SOIL EXCAVATED  
WHEN THE 50/50 METHOD  
OF CREATING A BUILDING.  
PAD

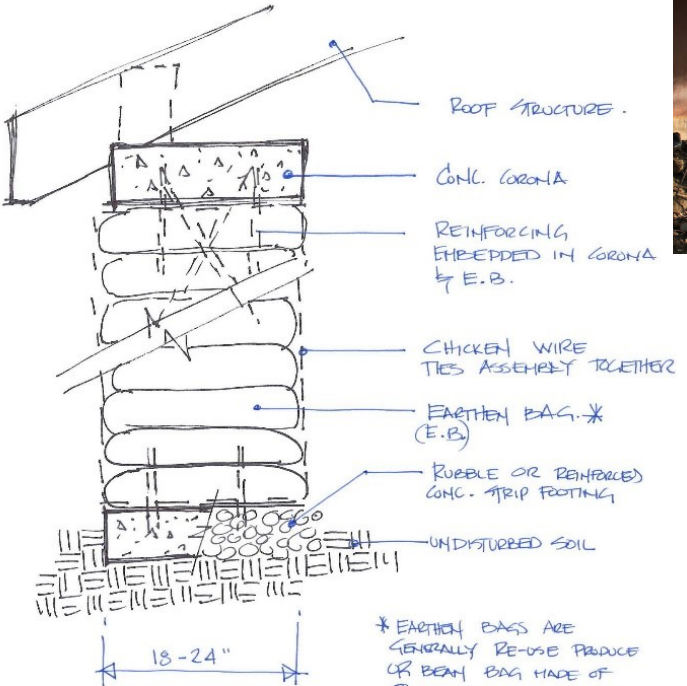
# Exterior Walls





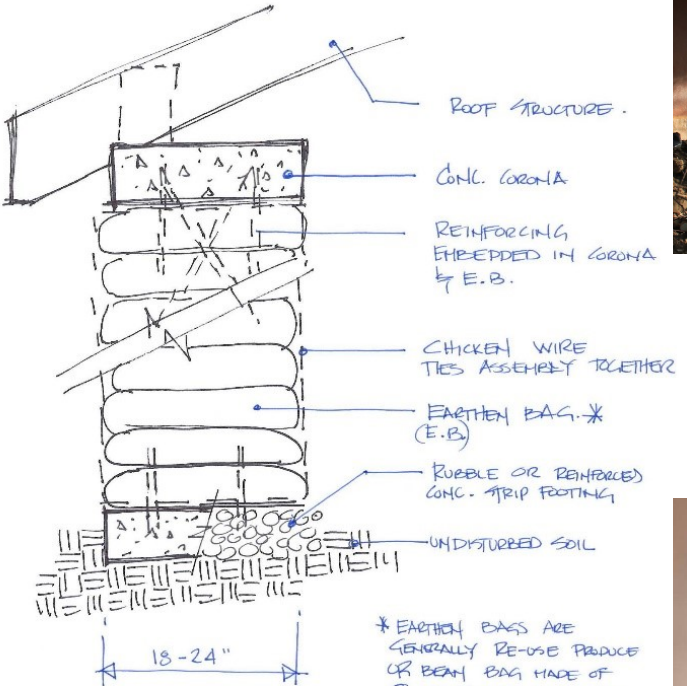
\* EARTHEN BAGS ARE GENERALLY RE-USE PRODUCE OR BEAN BAG MADE OF POLY PROPYLENE. THEY ARE FILLED WITH SOIL EXCAVATED WHEN THE 50/50 METHOD OF CREATING A BUILDING. PAD





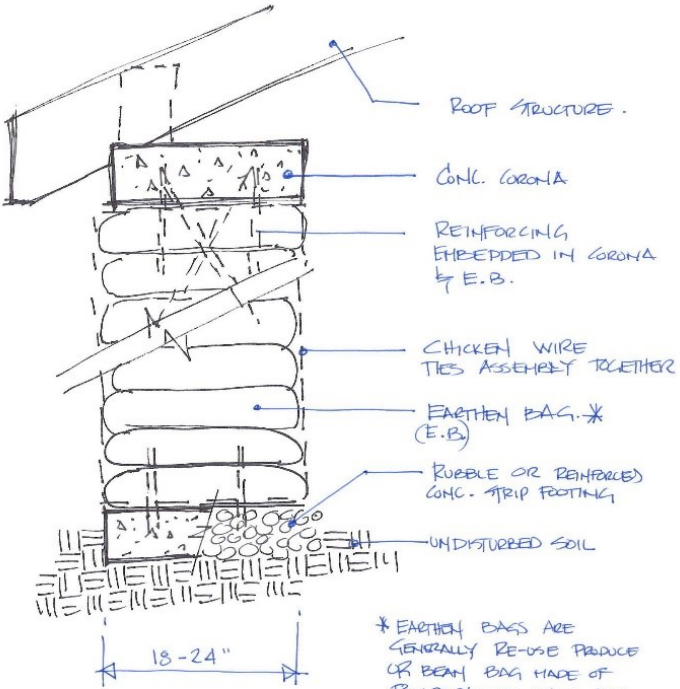
\* EARTHEN BAGS ARE GENERALLY RE-USE PRODUCE OR BEAN BAG MADE OF POLY PROPYLENE. THEY ARE FILLED WITH SOIL EXCAVATED WHEN THE 50/50 METHOD OF CREATING A BUILDING. PAD





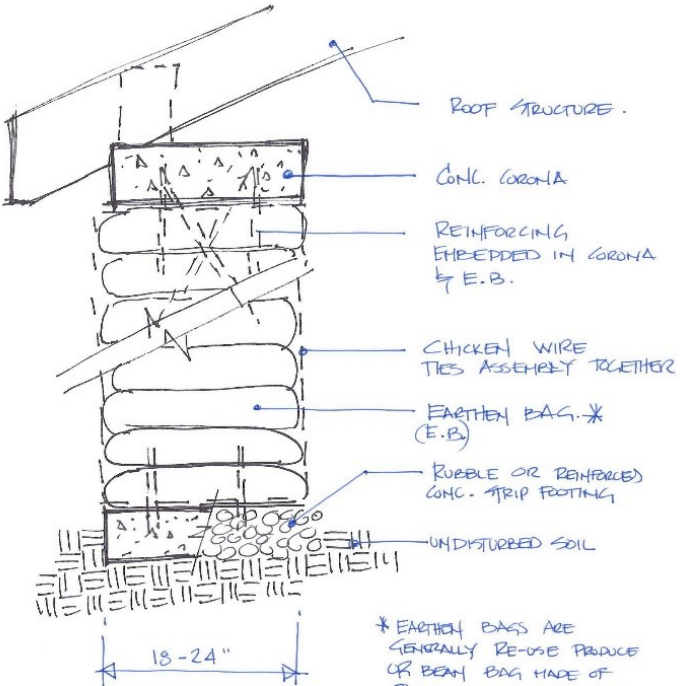
\* EARTHEN BAGS ARE GENERALLY RE-USE PRODUCE OR BEAN BAG MADE OF POLY PROPYLENE. THEY ARE FILLED WITH SOIL EXCAVATED WHEN THE SO/SO METHOD OF CREATING A BUILDING. PAD





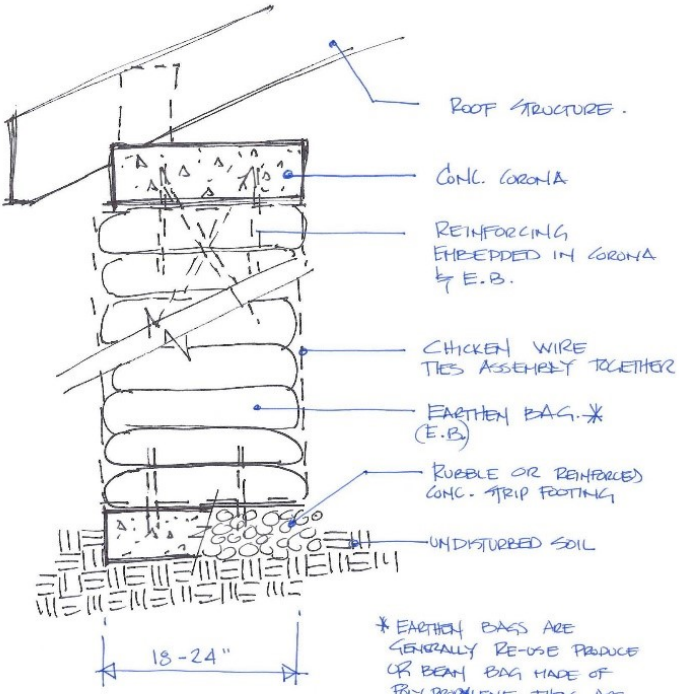
\* EARTHEN BAGS ARE GENERALLY RE-USE PRODUCE OR BEAN BAG MADE OF POLY PROPYLENE. THEY ARE FILLED WITH SOIL EXCAVATED WHEN THE SO/50 METHOD OF CREATING A BUILDING. PAD





\* EARTHEN BAGS ARE GENERALLY RE-USE PRODUCE OR BEAN BAG MADE OF POLY PROPYLENE. THEY ARE FILLED WITH SOIL EXCAVATED WHEN THE SO/50 METHOD OF CREATING A BUILDING . PAD



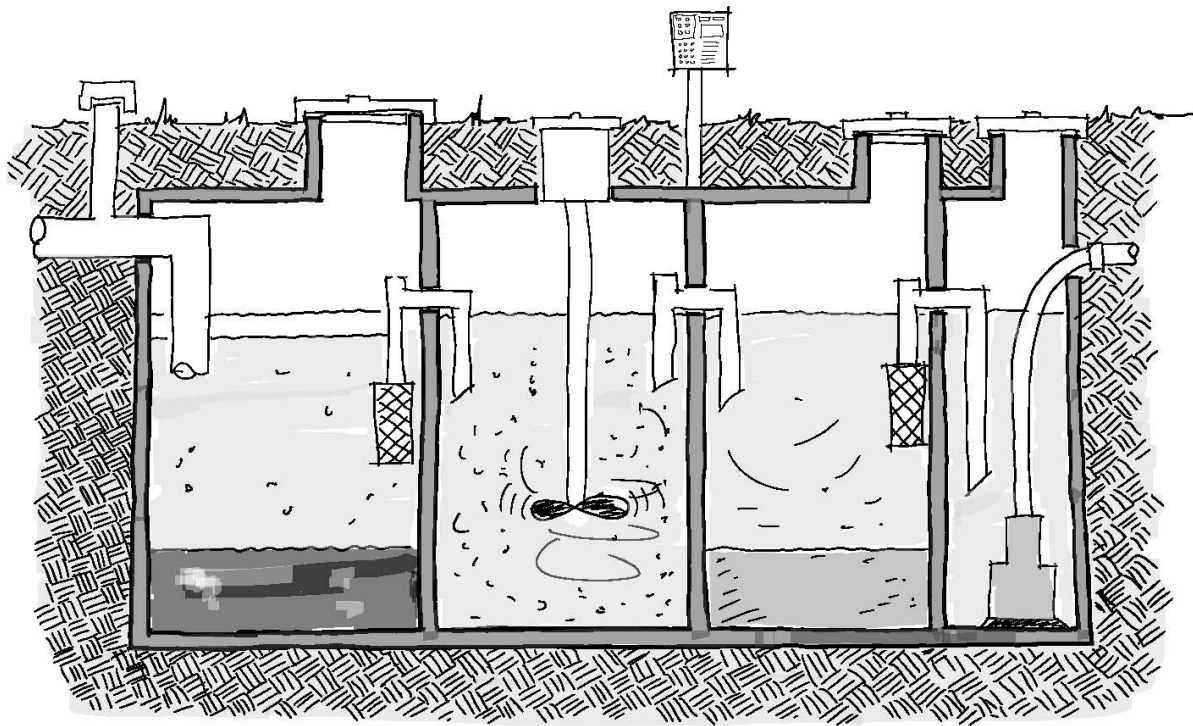


\* EARTHEN BAGS ARE GENERALLY RE-USE PADDLE OR BEAN BAG MADE OF POLY PROPYLENE. THEY ARE FILLED WITH SOIL EXCAVATED WHEN THE SO/SO METHOD OF CREATING A BUILDING. PAD



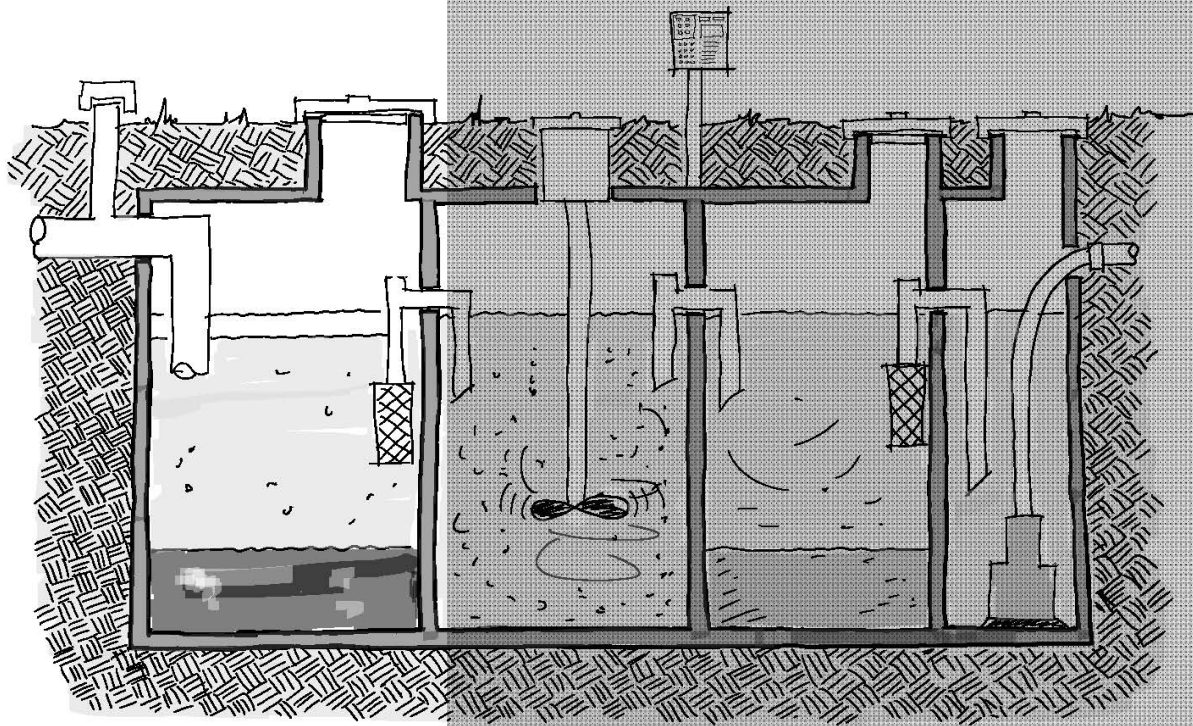
# Utilities





## Septic Systems

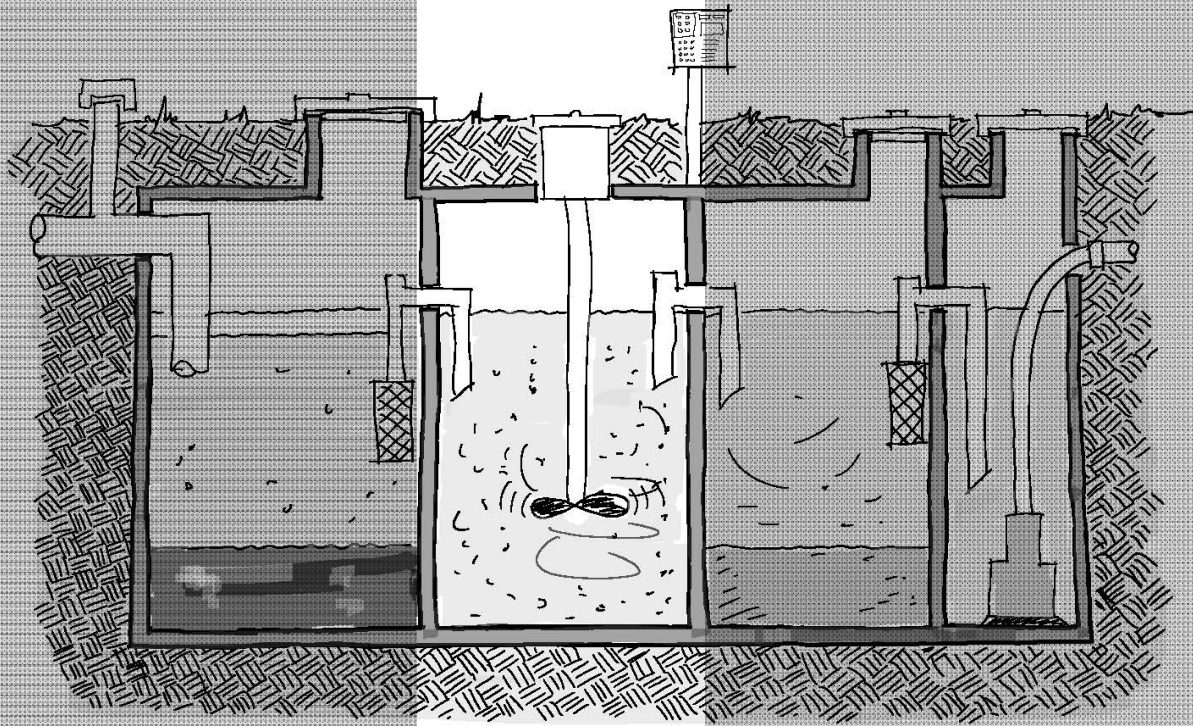




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## Septic Systems

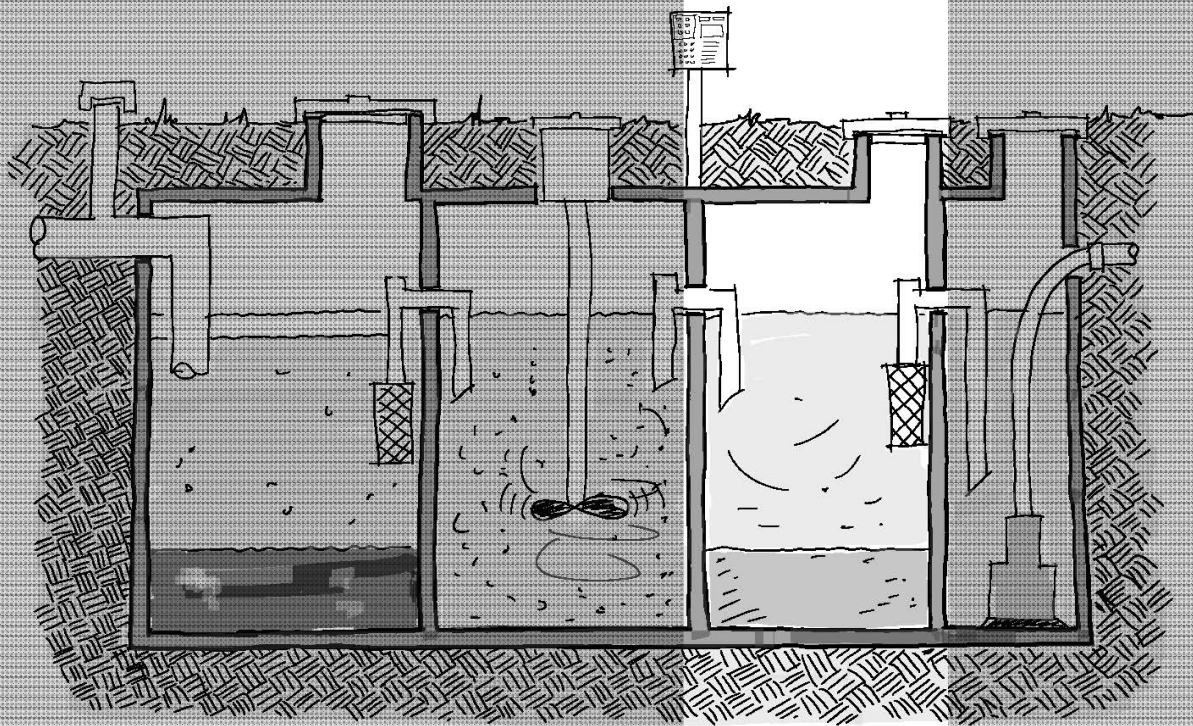




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## Septic Systems

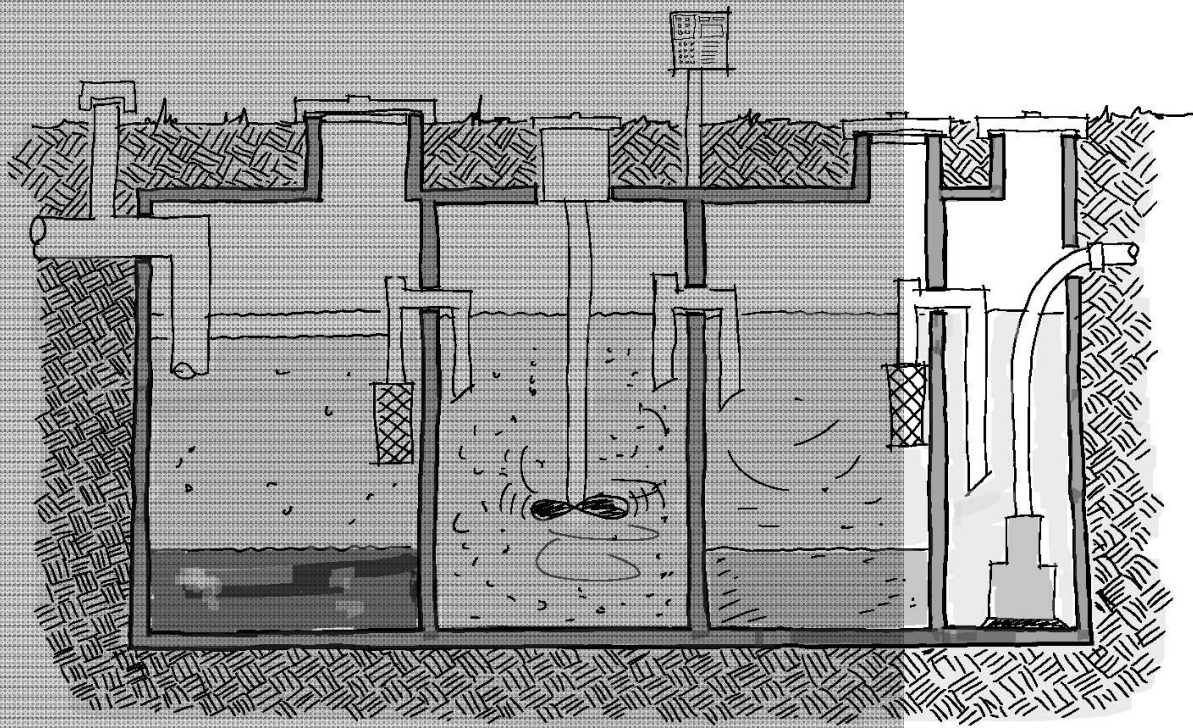




## Septic Systems

3

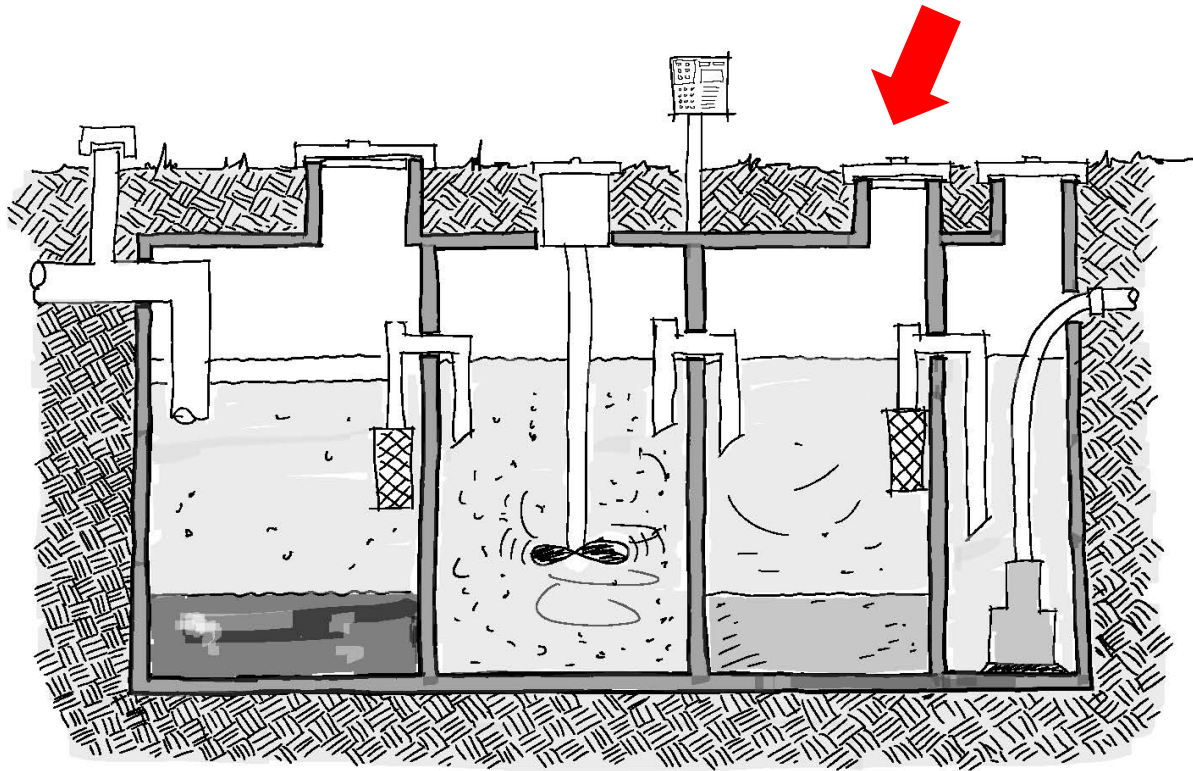




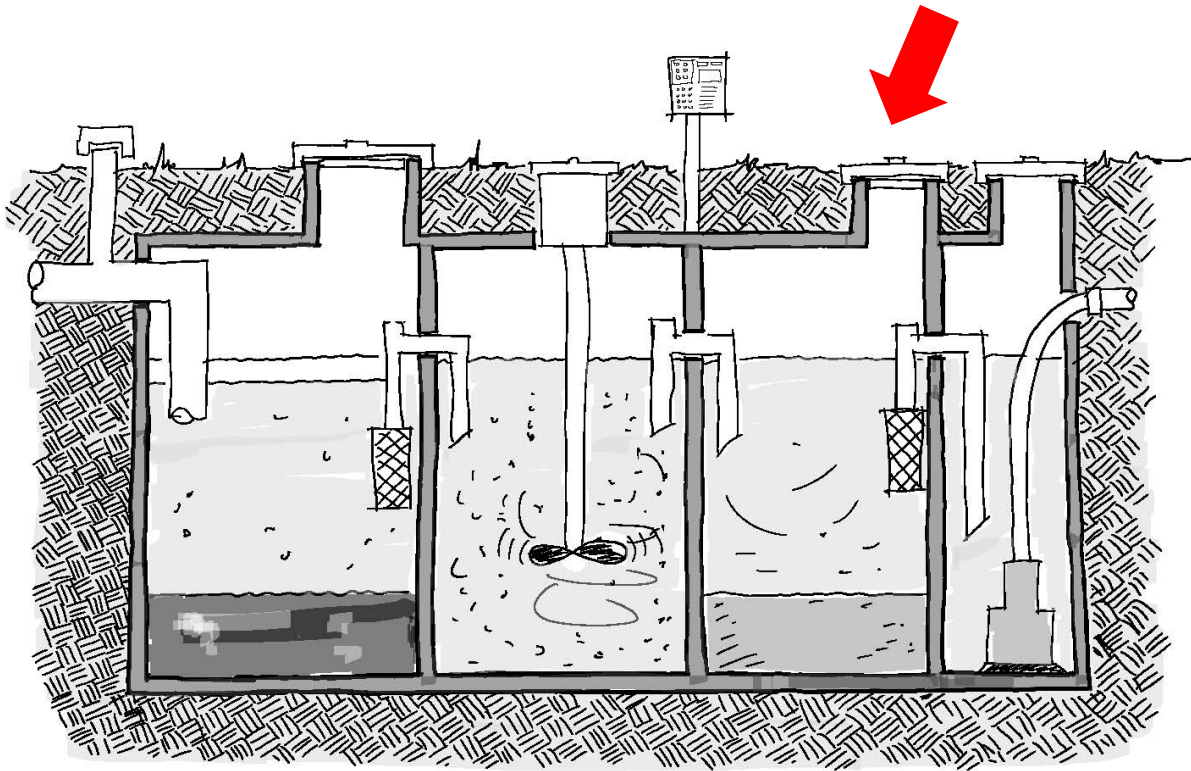
## Septic Systems

4





Septic  
Systems



## Septic Systems

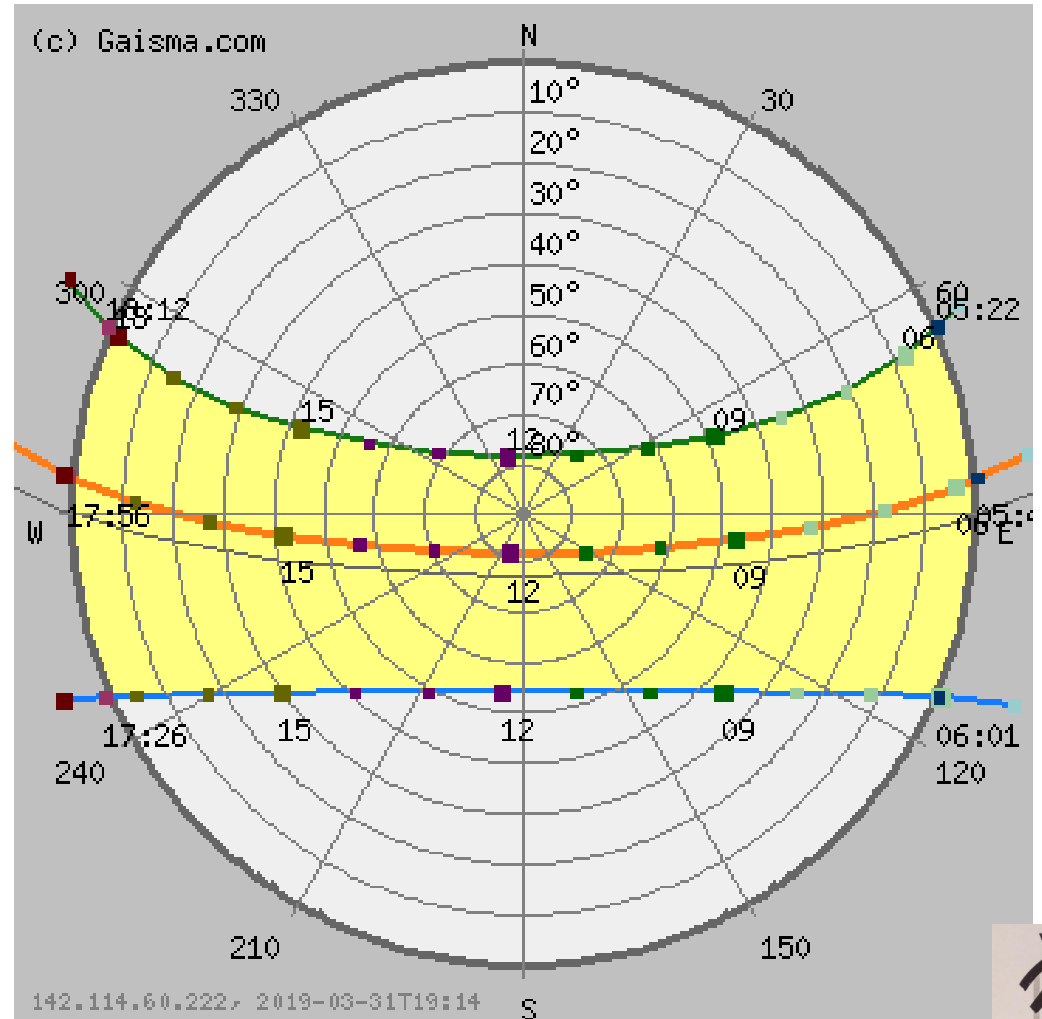


Energy

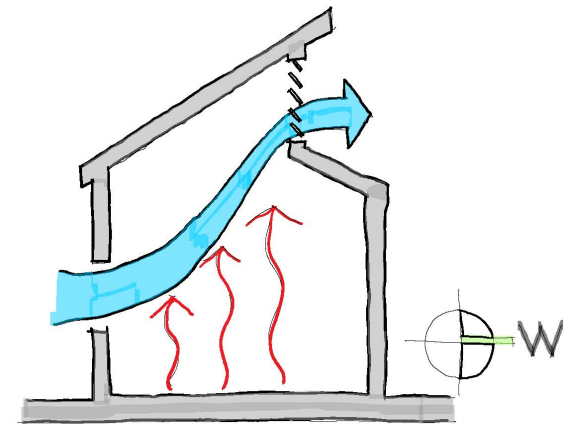
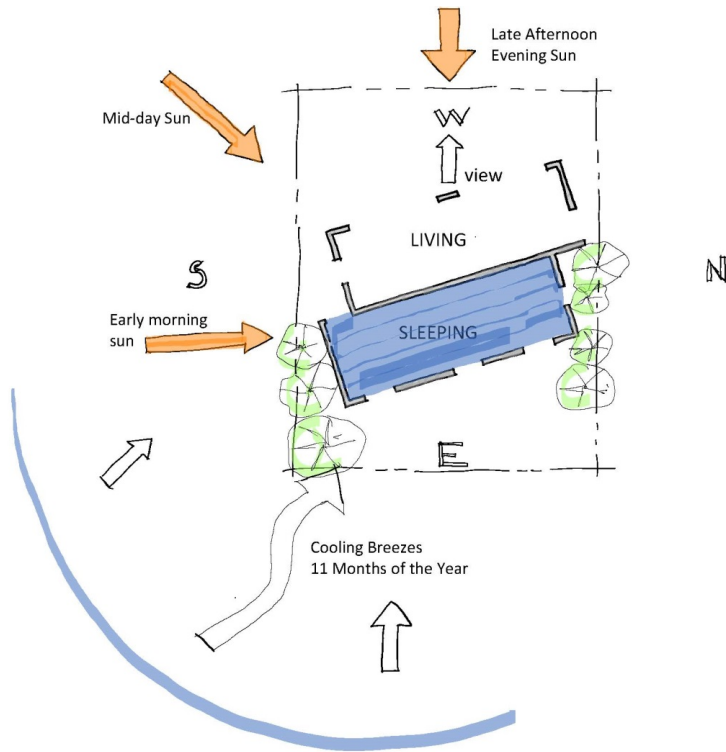


# Sun path diagram

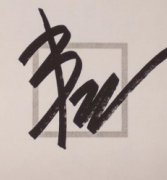
San Juan del Sur, Nicaragua



*Handwritten signature*



# Alternatives to Air Conditioning



Cantamar de Yankee

Development Refundable Damage Deposit

Date of Request

Date Received

Lot Information

Lot Number

Contact Information

First Name

Last Name

Telephone

email

Received: \$

Acknowledged:

X.  
Land Owners Association

Print:

X.  
Land Owner:

Print:

Date Signed:

mm/dd/yy

Expected Construction Start Date

Expected Construction End Date:

mm/dd/yy

mm/dd/yy

Conditions:  
Damage Deposit:  
Prior to the start of construction, the Land Owner is responsible for depositing  
\$

as a damage deposit with the Land Owners Association. This Damage Deposit is security that the Land Owner will comply with all the terms of the Architectural Guidelines. This Damage Deposit may not be used to pay Land Owners Association (LOA) fees. The Damage Deposit will be held at:

Bank Institution  
In a business savings account at an interest rate equal to the posted interest rate at the bank. The address of the bank is:  
Address:  
Interest due to the Land Owner will be credited toward LOA fees at each term fees are due during the period of construction. If construction is completed prior to a renewal period, the amount of interest owed will be returned to the Land Owner in the same manner as the damage deposit was rendered.

If the Land Owner breaks or other violates the conditions of the Architectural Guidelines, the Land Owners Association may be able to keep all or part of this damage deposit to cover the cost of repairs to development property and/or clean up of construction debris.

Upon notification by the Land Owner that construction is complete, the Land Owners Association will inspect and document the condition of Development property leading to the construction site and the area around the construction site. Within 30 days of the end of construction, the Land Owners Association will do one of two things:

- 1

If the Land Owner has complied with all the terms of the Architectural Guidelines and Development land is in the same condition as when construction commenced, the Land Owners Association will return the Damage Deposit plus any interest earned.
- or
- 2

The Land Owners Association will provide the Land Owner with a written notice including an itemized list as to why the full Damage Deposit amount is not being returned to the Land Owner and will return any remaining Damage Deposit owed to the Land Owner after the allowed deductions have been made.

The Land Owners Association may use as much of the Damage Deposit as necessary to pay for damages resulting from the Land Owners construction process.

If the Land Owner sells the property during the construction process, the Land Owner must notify the Land Owners Association and provide proof that the new owner of the property acknowledges this agreement and accepts the responsibility set forth in this agreement. The Damage Deposit paid remains with the Land and will not be refunded to the original Land Owner in the event of a property sale.

Cantamar de Yankee

Pre-Construction Design Submission

Date of Request

Date Received

Lot Information

Lot Number

Contact Information

First Name

Last Name

Telephone

email

Design Information: Check list:  
The following information must be included for all submissions. Please ensure accuracy of the submission to expedite your request. Missing information may delay approvals.

Site Plan

Lot Number

Building Location

Land scaping

Lot Size (in square metres)

Driveways

Retaining Walls

Set back information

Septic System Location

Large Trees (new)

Pool(s)

Site Section

Other

See example of Site Section provided

Foundation Plan  
Certified by Structural Engineer

Building Section(s)

Floor Plan

Building Elevations

mm/dd/yy

Expected Construction Start Date

Are all building materials called up on plans?

Are there currently other buildings construction on the site?

Yes

If yes:

No

Type of Building:

Recommendations

Approved:

Revise and Resubmit:

Not Approved:

Comments:

Design Review



Cantamar de Yankee

Development Refundable Damage Deposit

Date of Request

Date Received

Lot Information

Lot Number:

Contact Information

First Name

Last Name

Telephone

email

Received:

\$ \_\_\_\_\_

Acknowledged:

\_\_\_\_\_  
X.  
Land Owners Association

\_\_\_\_\_  
Print:

\_\_\_\_\_  
X.  
Land Owner:

\_\_\_\_\_  
Print:

\_\_\_\_\_  
Date Signed:  
mm/dd/yy

Expected Construction Start Date

Expected Construction

Design Review



\_\_\_\_\_  
mm/dd/yy

\_\_\_\_\_  
mm/dd/yy

**Conditions:**

Damage Deposit:

Prior to the start of construction, the Land Owner is responsible for depositing

\$ \_\_\_\_\_

as a damage deposit with the Land Owners Association. This Damage Deposit is security that the Land Owner will comply with all the terms of the Architectural Guidelines. This Damage Deposit may not be used to pay Land Owners Association (LOA) fees. The Damage Deposit will be held at:

\_\_\_\_\_  
Bank Institution

In a business savings account at an interest rate equal to the posted interest rate at the bank. The address of the bank is:

\_\_\_\_\_  
Address:

Interest due to the Land Owner will be credited toward LOA fees at each term fees are due during the period of construction. If construction is completed prior to a renewal period, the amount of interest owed will be returned to the Land Owner in the same manner as the damage deposit was rendered.

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- or
- 2

 The Land Owners Association will provide the Land Owner with a written notice including an itemized list as to why the full Damage Deposit amount is not being returned to the Land Owner and will return any remaining Damage Deposit owed to the Land Owner after the allowed deductions have been made.

The Land Owners Association may use as much of the Damage Deposit as necessary to pay for damages resulting from the Land Owners construction process.

If the Land Owner sells the property during the construction process, the Land Owner must notify the Land Owners Association of this agreement and accepts the responsibility set forth in this agreement. The Damage Deposit paid remains with the

**Design Review**



## Cantamar de Yankee

### Pre-Construction Design Submission

<input type="text"/>	<input type="text"/>	<input type="text"/>	
Date of Request	Date Received	Lot Information	
		<input type="text"/>	
		Lot Number:	
<b>Contact Information</b>			
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
First Name	Last Name	Telephone	email

#### Design Information: Check list:

The following information must be included for all submissions. Please ensure accuracy of the submission to expedite your request. Missing information may delay approvals.

#### Site Plan

<input type="checkbox"/> Lot Number	<input type="checkbox"/> Building Location	<input type="checkbox"/> Landscaping
<input type="checkbox"/> Lot Size (in square metres)	<input type="checkbox"/> Driveways	<input type="checkbox"/> Retaining Walls
<input type="checkbox"/> Set back information	<input type="checkbox"/> Septic System Location	<input type="checkbox"/> Large Trees (new)
<input type="checkbox"/> Pool(s)	<input type="checkbox"/> Site Section	<input type="checkbox"/> Other

See example of Site Section provided

#### Foundation Plan

Certified by Structural Engineer ☐

☐ Building Section(s)

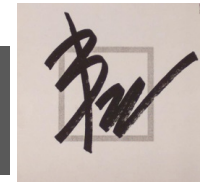
Floor Plan ☐

☐ Building Elevations

mm/dd/yy

Expected Construction Start Date

# Design Review



mm/dd/yy

**Expected Construction Start Date**

Are all building materials called up on plans? ☐

Are there currently other buildings construction on the site? ☐ Yes

If yes: ☐ No

Type of Building:

**Recommendations**

Approved: ☐

Revise and Resubmit: ☐

Not Approved: ☐

Comments:

Design Review





#### PROJECT INFORMATION:

**FLOOR CONSTRUCTION:**  
 IN ROOMS:  
 COLORED, POLISHED CONCRETE 24x24" SAW CUT LINES  
 ON DECKS UNDER ROOFS:  
 COLORED, POLISHED CONCRETE C/W INLAY STONES  
 ON POOL DECK, STAMPED CONCRETE

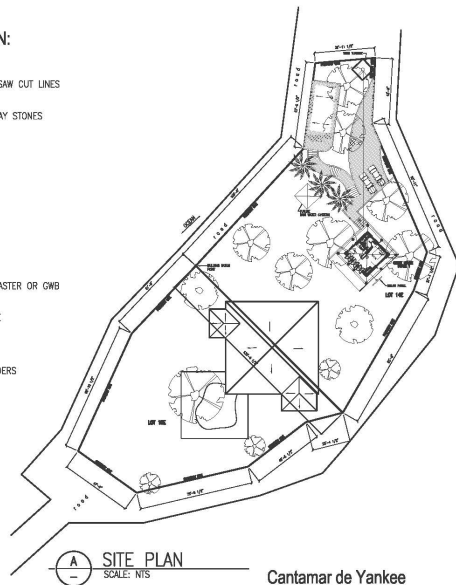
**WALLS:**  
 8" CONCRETE BLOCK (EXTERIORS)  
 4" CONCRETE BLOCK (INTERIORS)

**ROOF:**  
 NATURAL CLAY TILES ON  
 ZINC Q-DECK  
 STEEL PURLINS / TRUSSES

**IN ROOMS:**  
 FINISH CEILINGS FLAT AT 8'-0" WITH PLASTER OR GNB  
 IN LARGE OPEN DECK AREA:  
 FINISH AS PER CEILING IN GUEST HOUSE

**WINDOWS:**  
 DOUBLE BRICK ARCHES C/W  
 WOOD OR CAST IRON WINDOWS AND SLIDERS  
 ALL WINDOWS TO HAVE SCREENS

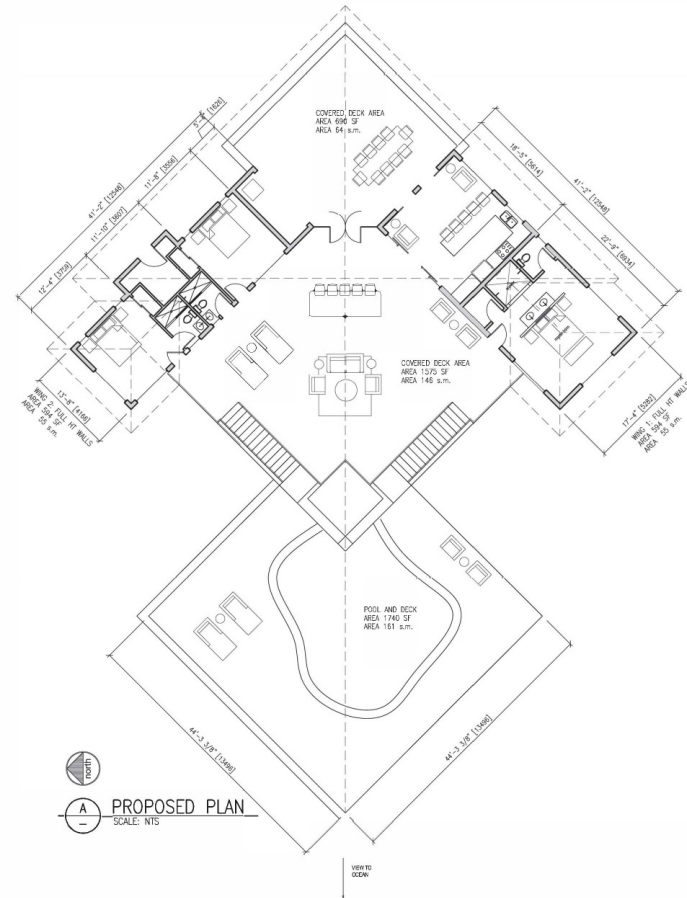
**DOORS:**  
 WOOD; SEE GUEST HOUSE  
 ALL DOORS TO HAVE SCREEN DOORS



**SITE PLAN**  
 SCALE: NTS

Cantamar de Yankee

december 23, 2017



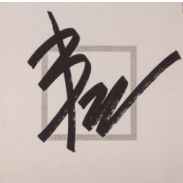
**PROPOSED PLAN**  
 SCALE: NTS

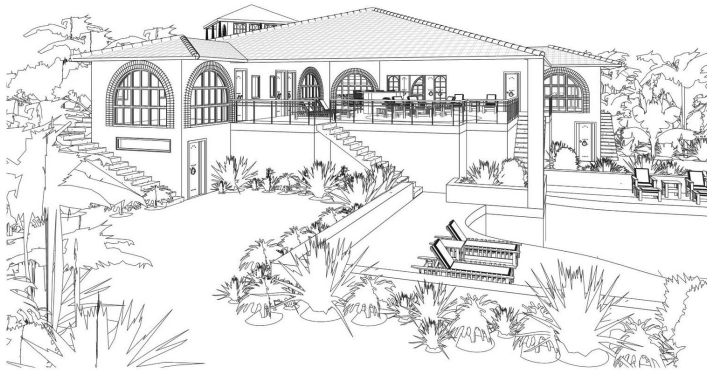
VIEW TO OCEAN

Cantamar de Yankee

## Examples of Design Submissions

december 23, 2017





#### PROJECT INFORMATION:

**FLOOR CONSTRUCTION:**  
 IN ROOMS:  
 COLORED, POLISHED CONCRETE 24x24" SAW CUT LINES  
 ON DECKS UNDER ROOFS:  
 COLORED, POLISHED CONCRETE C/W INLAY STONES  
 ON POOL DECK, STAMPED CONCRETE

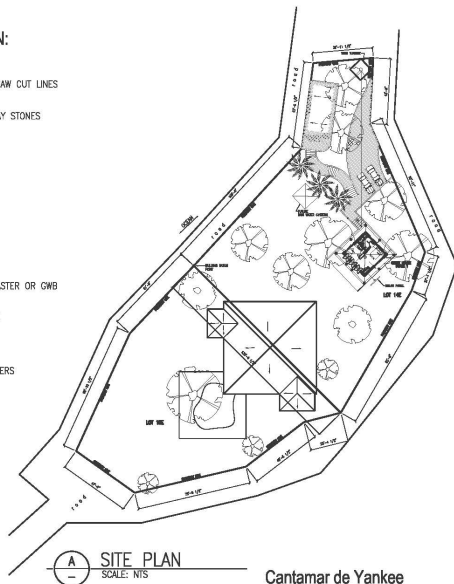
**WALLS:**  
 8" CONCRETE BLOCK (EXTERIORS)  
 4" CONCRETE BLOCK (INTERIORS)

**ROOF:**  
 NATURAL CLAY TILES ON  
 ZINC Q-DECK  
 STEEL PURLINS / TRUSSES

**IN ROOMS:**  
 FINISH CEILINGS FLAT AT 8'-0" WITH PLASTER OR GIB  
 IN LARGE OPEN DECK AREA:  
 FINISH AS PER CEILING IN GUEST HOUSE

**WINDOWS:**  
 DOUBLE BRICK ARCHES C/W  
 WOOD OR CAST IRON WINDOWS AND SLIDERS  
 ALL WINDOWS TO HAVE SCREENS

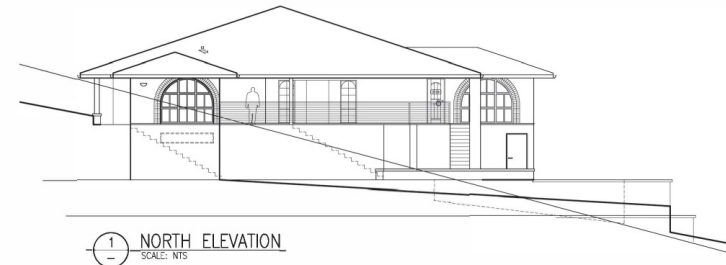
**DOORS:**  
 WOOD; SEE GUEST HOUSE  
 ALL DOORS TO HAVE SCREEN DOORS



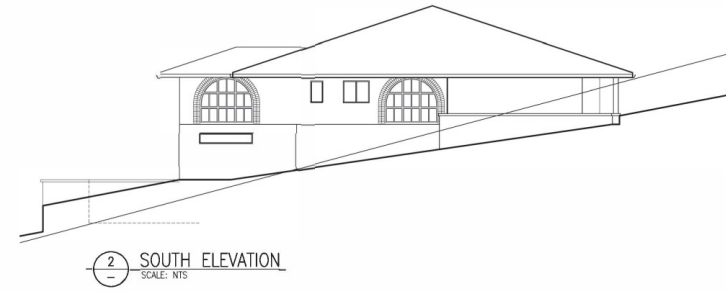
**A SITE PLAN**  
 SCALE: 1/8" = 1'-0"

Cantamar de Yankee

december 23, 2017



**1 NORTH ELEVATION**  
 SCALE: 1/8" = 1'-0"



**2 SOUTH ELEVATION**  
 SCALE: 1/8" = 1'-0"

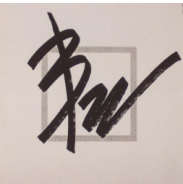


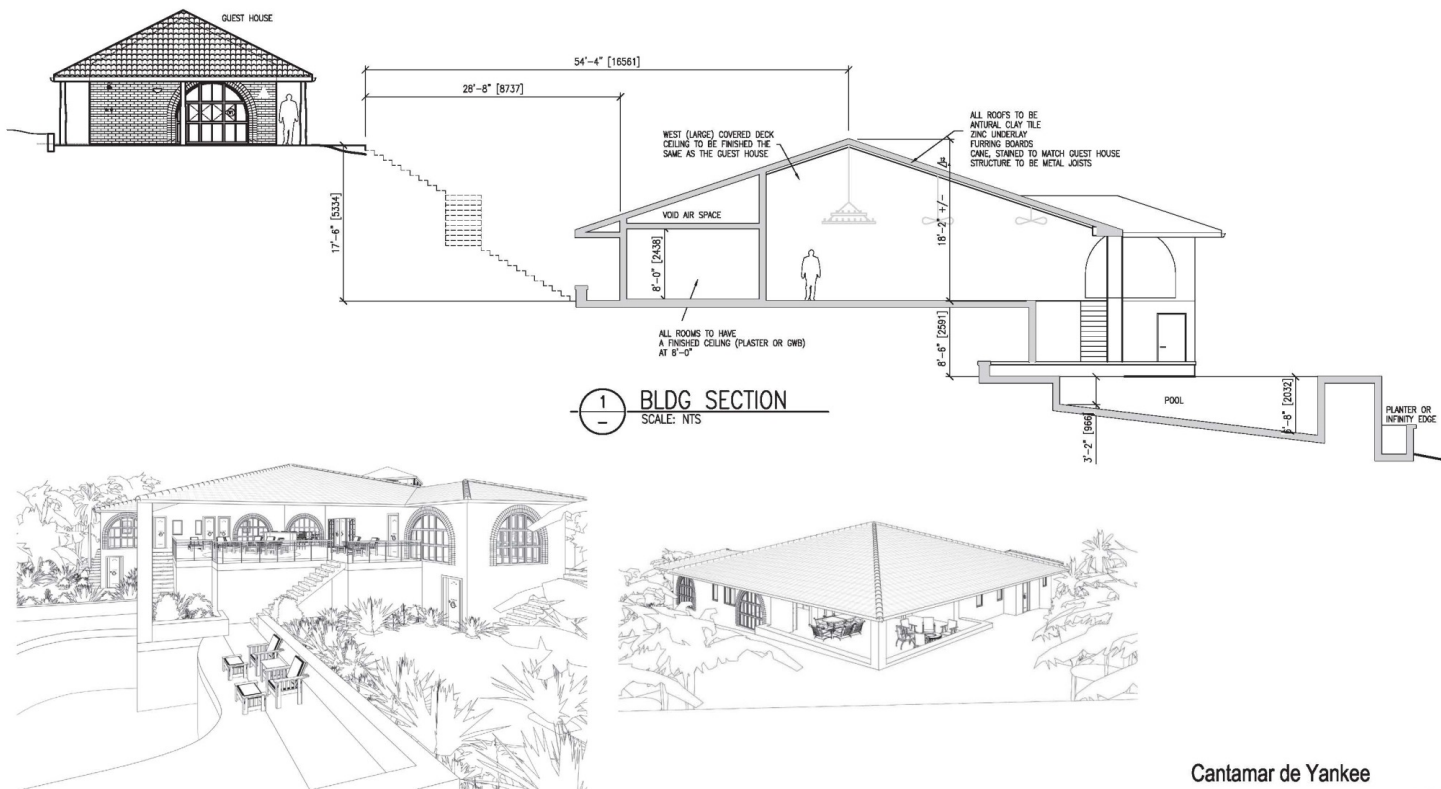
**3 WEST ELEVATION**  
 SCALE: 1/8" = 1'-0"

Cantamar de Yankee

## Examples of Design Submissions

december 23, 2017

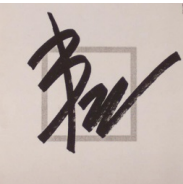


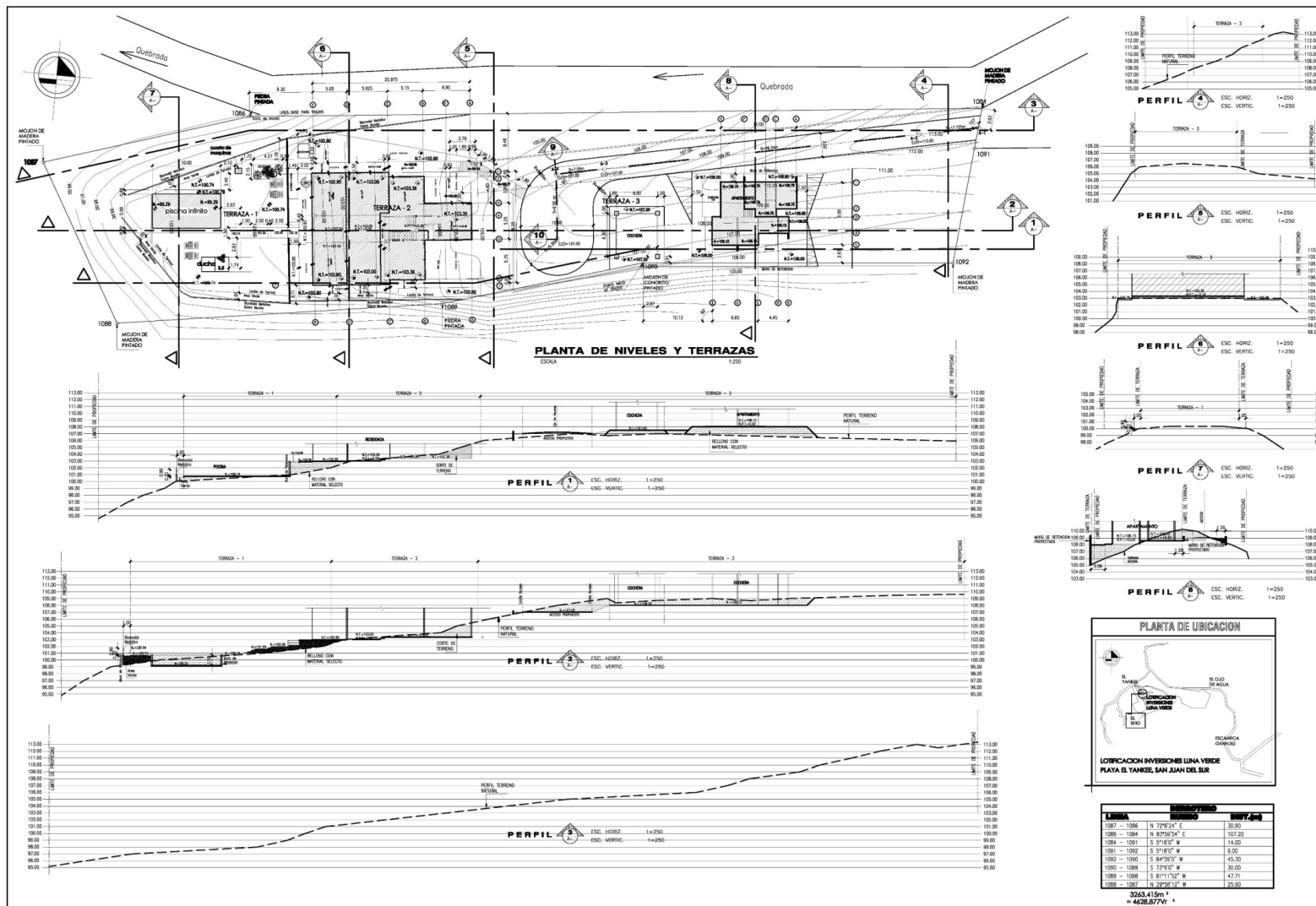


Cantamar de Yankee

december 23, 2017

Examples of Design Submissions





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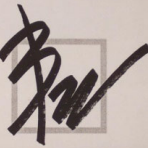








Security





# Ecological Development in a Developing Country

